

1945-47.

File No. 1605/36

B CLASS

Public Works DEPARTMENT

El BRANCH (1)

Subject:— Electrification Scheme
Kanara District

El. I.

File No. 7605/36.

DOCKET SHEET

Subject:—

File No. 7605/36

P. W. DEPT.

EC. BRANCH. (1).

References:—

Date.	To whom sent.	Notes and instructions.

DOCKET SHEET

Subject:—

File No. 7605/36

P.W. DEPT.

EC. BRANCH. (1)

References:—

Date.	To whom sent.	Notes and instructions.

ABSTRACT OF SURVEY DETAILS OF PLACES IN NORTH KANARA DISTRICT.

Enclosure 1.

~~CONFIDENTIAL~~

r. o.	Name of the generat- ing station	Name of the Place.	No. of Houses.	Population	Approx- imate length of Transmi- ssion lines in Miles.	Appro- ximate length of Distrib- -tion lines in Miles.	App. len- gth of combined Transmi- ssion & Distri- bution lines in Miles.	Proba- ble Night load in K.W.	Proba- ble Day load in K.W.	Probable sale of Non-Indus- trial Units.	Probable sale of Industrial Units.	Total sale of unit.	Remark
1	Karwar	Karwar + Sunheri, Handengadde & Bad village	4,616 + 1,171	15,812 + 4,250		16	4	64.6 + (5.4 for village area).	49.7	1,27,411	72,195	1,99,606	
2	Gokarn	Gokarn	1,708	10,082	-	3	-	27.6	21.6	44,998	28,800	73,798	
3	Kumta	Kumta & Honavar	3015 + 2106	12,466 + 8,939	12	16½	5	49.7 + 40.1	64.2 + 37.8	1,42,554	1,84,532	3,27,086	
4.	Sirsi	Sirsi	2,005	10,451	-	9	-	49.6	37.7	78,871	65,850	1,44,721	
5	Bhatkal	Bhatkal	1,500	10,718	-	3½	2½	60.1	55.0	1,01,887	~~xx~~ 1,44,070	2,45,957	

~~Enclosure~~

PROPOSED DIESEL ELECTRIC SCHEMES IN THE PROVINCE OF BOMBAY.

Enclosure 2.

Statement giving Financial Details.

Serial No.	Name of Place. 2	Station Capacity. 3	Estimated Capital Expenditure. 4	Anticipated Revenue. 5	Anticipated Working Cost. 6	Amount for Depreciation + Interest @ 3½%		Anticipated Nett profit or loss in the 5th year. 8
						Rs.	Rs.	
1.	Karwar.	135/150	4,38,000	62,306	28,580	33,672		54
2.	Gokarn.	90/100	1,75,000	20,913	14,580	13,861		7,528
3.	Kumta & Hona- var.	240/250	6,85,000	86,967	41,552	52,398		6,983
4.	Sirsi (	135/150	3,02,000	42,456	22,149	23,643		3,336
5.	Bhatkal.	135/150	3,10,000	55,751	30,562	24,180 (4.3)		+ 1,009
	Total.....	735/800	19,10,000	2,68,393	1,37,423	1,47,754		- 16,784

Note : The supply voltage for generation is 400/440 volts throughout, that for transmission 11000 volts for all the Stations except that for the Stations under serial Nos. 2 & 4 in which case the voltage will be the same as that for generation.

Each of the Stations under serial No. 1,4, and 5 will contain one 90/100 K.W. and one 45/50 K.W. set.

Station under serial No.2 will contain Two 45/50 K.W. Sets.

VLS Station under serial No.3 will contain. one 90/100 K.W. and one 150 KW. set.

Basis cost of fuel

Rs. 90 per Ton + 15% for 1st yea
 Rs. 90 per Ton + 10% for 2nd yea
 Rs. 90 per Ton + 5% for 3rd yea.
 Rs. 90 per Ton for the fourth and
 Subsequent years.

KARWAR

Basis Tariff Rates :-

6 As. per unit for lighting
 1½ As. per unit for the first 2000 units
 of motive power and 1 anna per unit for
 all the additional units plus a fixed
 charge of Rs.1-12-0 per month per H.P.
 connected.

N.B. :- i) The figures marked @ allow for depreciation & Interest for additional
 set of 90/100 KW (Rs.3675).

ii) The figures marked * allow for reduction in tariff rates by ½ anna.

iii) The figures marked @ allow for reduction in Tariff rates by ¼ anna.

Year.	Pro- bable max. demand in KW.	Probable Revenue			Probable sale of Units.			Total units generated.	Approximate working Cost.	Amount Dep. & Int.	Nett profit or loss.
		Lighting.	Power.	Total.	Lighting.	Power.	Total.				
		Rs.	Rs.	Rs.					Rs.	Rs.	Rs.
1st	21	10,918	2,571	13,489	25,482	24,065	49,547	60,000	22,680	33,672	-42,863
2nd	44	27,296	5,142	32,438	63,705	48,130	1,11,835	1,34,000	25,385	33,672	-26,619
3rd	63	40,944	6,180	47,114	95,558	57,756	1,53,314	1,81,000	26,856	33,672	-13,414
4th	75	49,133	6,941	56,074	1,14,669	64,975	1,79,644	2,16,000	27,752	33,672	- 5,350
✓ 5th	82	54,593	7,713	62,306	1,27,411	72,195	1,99,606	2,40,000	28,580	33,672	+ 54
6th	90	60,052	8,098	68,150	1,40,152	75,804	2,15,956	2,60,000	29,270	33,672	+ 5,208
7th	98	@63,123	@7,244	@70,367	1,52,893	79,414	2,32,307	2,80,000	29,860	@37,347	+ 3,060
8th	105	*65,794	*6,275	*72,069	1,65,634	83,024	2,48,658	2,99,000	30,615	@37,347	+ 4,107
9th	113	*70,856	*6,548	*77,404	1,78,875	86,633	2,65,008	3,19,000	31,305	@37,347	+ 8,752
10th	120	*75,917	*6,821	*82,738	1,91,116	90,243	2,81,359	3,38,000	31,961	@37,347	+13,430

Basis cost of Fuel :-

G O K A R N.

Basis Tariff Rates:-

Enclosure 4.

Rs. 90 per Ton + 15% for 1st year.
 Rs. 90 per Ton + 10% for 2nd year.
 Rs. 90 per Ton + 5% for 3rd year.
 Rs. 90 per Ton for the fourth and
 subsequent years.

6 As. per unit for lighting.
 1 1/4 As. per unit for the first 2000 units.
 of motive power and 1 anna per unit.
 for all the additional units plus a fixed
 charge of Rs. 1-12-0 per month per H.P.
 connected.

Year.	Pro- bable max. demand in K.W.	Probable Revenue			Probable sale of Units.			Total units generated.	Approxi- mate working Cost.	Amount Dep. & Int.	Nett profit or loss.
		Lighting.	Power.	Total.	Lighting.	Power.	Total.				
		Rs.	Rs.	Rs.					Rs.	Rs.	Rs.
1st	11	3,459	1,206	4,665	8,999	9,600	18,599	22,000	12,109	13,861	- 21,305
2nd	23	8,647	2,412	11,059	22,499	19,200	41,699	51,000	13,267	13,861	- 16,069
3rd	27	12,971	2,894	15,865	33,748	23,040	56,788	70,000	13,921	13,861	- 11,917
4th	31	15,565	3,256	18,821	40,498	25,920	66,418	81,000	14,204	13,861	- 9,244
5th	34	17,295	3,618	20,913	44,998	28,800	73,798	91,000	14,580	13,861	- 7,528
6th	37	19,024	3,798	22,822	49,497	30,240	79,737	98,000	14,843	13,861	- 5,882
7th	40	20,754	3,979	24,733	53,997	31,680	85,677	1,05,000	15,106	13,861	- 4,234
8th	44	22,483	4,160	26,643	58,497	33,120	91,617	1,13,000	15,406	13,861	- 2,624
9th	47	24,213	4,341	28,554	62,997	34,560	97,557	1,20,000	15,669	13,861	- 976
10th	50	25,942	4,522	30,464	67,497	36,000	1,03,497	1,27,000	15,932	13,861	+ 671

VLS

Basis Cost of Fuel:

Rs. 90 per Ton + 15% for 1st year.
 Rs. 90 per Ton + 10% for 2nd year.
 Rs. 90 per Ton + 5% for 3rd year.
 Rs. 90 per Ton for the fourth and subsequent years.

Kumta & Honavar
Combined Electrification.

Basis Tariff Rates :-

6 As. per unit for lighting
 1½ As. per unit for the first 2000 units of motive power and ½ anna per unit for all the additional units plus a fixed charge of Rs. 1-12-0 per month per H.P. connected.

N. B. :- The figures marked * allow for reduction in Tariff rates by ½ anna.

The figures marked @ allow for reduction in Tariff rates by ¼ anna.

Year.	Probable max. demand in KW.	Probable Revenue			Probable sale of Units.			Total units generated.	Approximate working Cost.	Amount Dep. & Int.	Nett profit or loss.
		Lighting.	Power.	Total.	Lighting.	Power.	Total.				
		Rs.	Rs.	Rs.					Rs.	Rs.	Rs.
1st	40	13,890	5,839	19,729	28,510	61,510	90,020	1,09,000	32,987	52,398	- 65,656
2nd	82	34,725	11,678	46,403	71,277	1,23,020	1,94,297	2,37,000	37,346	52,398	- 43,341
3rd	92	52,087	14,013	66,100	1,06,915	1,47,625	2,54,540	3,10,000	39,433	52,398	- 25,731
4th	103	62,505	15,765	78,270	1,28,298	1,66,078	2,94,376	3,59,000	40,511	52,398	- 14,639
5th	115	69,450	17,517	86,967	1,42,554	1,84,532	3,27,086 ✓	3,91,300	41,552	52,398	- 6,983
6th	122	76,395	18,392	94,787	1,56,809	1,93,758	3,50,567 ✓	4,27,000	42,701	52,398	- 312
7th	129	83,340	19,268	1,02,608	1,71,064	2,02,985	3,74,049	4,56,000	43,635	52,398	+ 6,575
8th	136	@ 87,390	@ 16,829	@ 1,04,219	1,85,320	2,12,211	3,97,531	4,85,000	44,569	52,398	+ 7,252
9th	143	* 90,994	* 14,101	* 1,05,095	1,99,575	2,21,438	4,21,013 ✓	5,14,000	45,502	52,398	+ 7,195
10th	150	* 97,493	* 14,688	* 1,12,181	2,13,831	2,30,665	4,44,496	5,42,000	✓ 46,404	52,398	+ 13,379

sis cost of Fuel :-

SIRSI (M.P.S.)

Basis Tariff Rates :-

Rs. 90 per Ton + 15% for 1st year.
 Rs. 90 per Ton + 10% for 2nd year.
 Rs. 90 per Ton + 5% for 3rd year.
 Rs. 90 per Ton for the fourth and
 subsequent years.

6 As. per unit for lighting.
 1½ As. per unit for the first 2000 units
 of motive power and 1 anna per unit for
 all the additional units plus a fixed
 charge of Rs.1-12-0 per month per H.P.
 connected.

N. B. :- The Figures marked * allow for reduction in Tariff rates by ½ anna.

The Figures marked @ allow for reduction in Tariff rates by ¼ anna.

Year.	Pro- bable max. demand in KW.	Probable Revenue			Probable sale of Units.			Total units generated.	Approximate working Cost.	Amount Dep. & Int.	Nett profit or loss.
		Lighting.	Power.	Total.	Lighting.	Power.	Total.				
									Rs.	Rs.	Rs.
1st	14	7,230	2,102	9,332	15,774	21,950	37,724	44,000	18,050	23,643	- 32,361
2nd	31	18,075	4,204	22,279	39,435	43,900	83,335	97,000	19,991	23,643	- 21,355
3rd	45	27,112	5,044	32,156	59,153	52,680	1,11,833	1,31,000	21,059	23,643	- 12,546
4th	53	32,535	5,675	38,210	70,983	59,265	1,30,248	1,53,000	21,595	23,643	- 7,028
✓ 5th	60	36,150	6,306	✓ 42,456	78,871	65,850	✓ 1,44,721	1,69,000	✓ 22,149	23,643	- 3,336
✓ 6th	69	39,765	6,621	46,386 ✓	86,758	69,142	✓ 1,55,900	1,82,000	✓ 22,599	23,643 ✓	+ 144
✓ 7th	73	43,380	6,936	50,316 ✓	94,645	72,435	✓ 1,67,080	1,95,000	✓ 23,049	23,643 ✓	+ 3,624
✓ 8th	77	@ 45,393	@ 6,068	@ 51,461 ✓	1,02,532	75,727	✓ 1,78,259	2,08,000	✓ 23,499	23,643 ✓	+ 4,319
✓ 9th	81	@ 47,160	* 5,097	* 52,257 ✓	1,10,419	79,020	✓ 1,89,439	2,21,000	✓ 23,949	23,643 ✓	+ 4,665
✓ 10th	85	* 50,528	* 5,309	* 55,837 ✓	1,18,306	82,312	2,00,618	2,34,000	✓ 24,399	23,643 ✓	+ 7,795

Basiscost of fuel:-

B H A T K A L.

Basic Tariff Rates:-

Rs. 90 per Ton + 15% for 1st year.
 Rs. 90 per Ton + 10% for 2nd year.
 Rs. 90 per Ton + 5% for 3rd year.
 Rs. 90 per Ton for the fourth and subsequent years.

6 As . per unit for lighting
 1½ As. per unit for the first 2000 units of motive power and 1 anna per unit for all the additional units plus a fixed charge of Rs.1-12-0 per month per H.P. (connected).

N.B.: - The Figures marked * allow for Depreciation and Interest for additional set of 90 K.W. (Rs.3675)

The Figures marked & allow for reduction in Tariff rates by ¼ anna.
 The Figures marked < allow for reduction in Tariff rates by ½ anna.

Year.	Probable max. demand in K.W.	Probable Revenue			Probable sale of Units.			Total units generated.	Approximate Working Cost.	Amount Dep. & Int.	Nett profit or loss.
		Lighting.	Power.	Total.	Lighting.	Power.	Total.				
		Rs.	Rs.	Rs.					Rs.	Rs.	Rs.
1st	32	8,403	4,578	12,981	20,377	48,023	68,400	81,000	23,697	24,180	- 34,896
2nd	65	21,008	9,156	30,164	50,943	96,046	1,46,989	1,74,000	27,094	24,180	- 21,120
3rd	76	31,512	10,988	42,500	76,415	1,15,256	1,91,671	2,28,000	28,745	24,180	- 10,425
4th	85	37,814	12,361	50,175	91,698	1,29,663	2,21,361	2,63,000	29,560	24,180	- 3,565
✓5th	95	42,016	13,735	55,751 ✓	1,01,887	1,44,070	2,45,957 ✓	2,92,000	30,562 ✓	24,180 ✓	+ 1,009
✓6th	100	46,217	14,421	60,638 ✓	1,12,075	1,51,273	2,63,348 ✓	3,14,000	31,321 ✓	24,180 ✓	+ 5,137
✓7th	107	<48,509	<12,632	<61,141 ✓	1,22,264	1,58,477	2,80,741 ✓	3,34,000	32,011 ✓	*27,855 ✓	+ 1,275
✓8th	114	<52,551	<13,207	<65,758 ✓	1,32,453	1,65,680	2,98,133 ✓	3,55,000	32,736 ✓	*27,855 ✓	+ 5,167
✓9th	121	&54,365	&11,079	&65,444 ✓	1,42,641	1,72,884	3,15,525 ✓	3,75,000	33,427 ✓	*27,855 ✓	+ 4,162
✓10th	128	&58,249	&11,541	&69,790 ✓	1,52,830	1,80,087	3,32,917	3,96,000	34,152	*27,855	+ 7,783

KARWAR - DISTRICT.

Enclosure 8.

Statement of Profit and Loss. - ~~Sub-Station~~

Serial No.	Name of Place.	1st year.	2nd year.	3rd year.	4th year.	5th year.	6th year.	7th year.	8th year.	9th year.	10th year.
1.	Karwar.	- 42,363	- 26,619	-13,414	- 5,350	+ 54	+ 5,208	+ 3,060	+ 4,107	+ 8,752	+13,430
2.	Gokarn.	- 21,305	- 16,069	-11,917	- 9,244	- 7,588	- 5,882	- 4,234	- 2,624	- 976	+ 671
3.	Kumta & Honavar.	- 65,656	- 43,341	-25,731	-14,639	- 6,983	- 312	+ 6,575	+ 7,252	+ 7,195	+13,379
4.	Sirsi.	- 32,361	- 21,355	-12,546	- 7,028	- 3,336	+ 144	+ 3,624	+ 4,319	+ 4,665	+ 7,795
5.	Bhatkal.	- 34,896	- 21,110	-10,425	- 3,565	+ 1,009	+ 5,137	+ 1,275	+ 5,167	+ 4,162	+ 7,783
.	Total...	-1,97,081	-1,28,494	-74,033	-39,826	-16,784	+ 4,295	+10,300	+18,221	+23,798	+43,058

~~Enclosure 8~~

Abstract of Preliminary Estimates for Power House,
Transmission and Distribution lines etc. in connec-
tions with the proposed electrification of various
places in North Kanara District.

S. No.	Name of place.	Power House Machinery etc. Rs.	Transmis- sion and Distribu- tion. Rs.	Transfer- mers Swit- ch gears, Meters, St. light fittings, House ser- vices etc. Rs.	Testing Apparatus & Miscella- neous. Rs.	Total Capital.	Re marks.
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S C H E M E 'A'

1.	Karwar.	1,69,890	1,52,000	1,04,260	11,850	4,38,000	
2.	Gokarn.	1,13,200	21,000	35,150	5,650	1,75,000	
3.	Kumta and Honavar.	2,53,770	2,55,500	1,61,500	14,230	6,85,000	
4.	Sirsi.	1,61,700	72,000	60,400	7,900	3,02,000	
5.	Bhatkal.	1,69,890	49,500	80,250	10,360	3,10,000	
Total.		8,68,450	5,50,000	4,41,560	49,990	19,10,000	

Preliminary Estimate for a Power Station comprising Two Diesel Engines, Alternator Sets as detailed below in connection with the proposed electrification of various places in North Kanara District.

~~Scheme 600~~

Particulars.	2 Sets each of 1-90/100 K.W., 1-45/50) 3 Phase, 50 Cycles & 4 wires 400/440 Volts.	2 Sets each of 45/50 K.W., 3 Phase, 50 Cycles, 4 wires 400/440 Volts.	2 Sets each of 1-150) K.W., 3 1-90/100) phase, 50 Cycles 4 wires 400/440 Volts.	2 Sets each of 1-90/100 K.W., 3 1-45/50) phase, 50 50 Cycles 4 wires 400/440 Volts.	2 Sets each of 1-90/100 K.W., 3 1-45/50) K.W., 3 1-45/50) phase, 50 Cycles 4 wires 400/440 Volts.
	(11 KV Transmission) K A R 1. A R Rs.	(Medium Pressure Supply) G O K 2. A R Rs.	(11 KV Transmission) KUMTA 3. & HONAVAR Rs.	(Medium Pressure Supply) S 1 4. S 1. Rs.	(11 KV Transmission) B H A 5. K A L Rs.
(1) Power House building including cost of founda- tions for two Diesel Sets.	32,300	20,600	48,500	32,300	32,300
(2) Two Diesel Engine. Alter- nator Sets equipped with Fuel oil storage tank with piping, semeretary pump, compressed air starting equipment and receiver, concrete cool- ing water tank with pipe work and small over- head afterrun tank, cir- culating water motor pumping sets, Transfor- mers, Switchgear, Switch- board, interconnecting cables, Five ton over- head hand operated crane including gantry girders & rails, erection and supervision.	1,32,590	90,600	2,00,270	1,24,400	1,32,590
(3) Miscellaneous including small workshop tools.	5,000	2,000	5,000	5,000	5,000
Total.	1,69,890	1,13,200	2,53,770	1,61,700	1,69,890

N. B. Transformers & Switchgears are not included in case of Gokarn and Sirsi. In case of Kumta and Honavar, cost of Receiving Station is included in Power House Building.

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PROPOSED DIESEL ELECTRIC SCHEMES
IN NORTH KANARA DISTRICT
IN THE PROVINCE OF BOMBAY

1. Features of the District:-

The District of Kanara is divided into high and low level tracts, one above and the other below Ghats. The below-Ghat portion is a fairly level plain along the coast from five to ten miles in breadth and mainly consisting of rice fields and cocoanut gardens. It comprises the populated portion of the District.

The above-Ghat tract is mainly covered with forest and dotted with thinly populated hamlets which cannot be economically served with electricity from isolated diesel electric plants owing to the present day high cost of equipment.

2. Survey of selected places along the coast:-

Accordingly it was decided that electric load survey of some selected places along the coast should be carried out and the places selected for the purpose are listed in enclosure 1, which also gives details of anticipated loads and other data such as lengths of transmission and distribution lines involved.

3. Population:-

The total population of the District is 4,41,157. The population of the six ^{towns} places and three villages surveyed and mentioned in enclosure 1, is 73,318. This means that about 17 per cent. of the population of the District, will be provided with electricity in the ~~xxx~~ event of all the ~~nine~~ places being electrified.

4. Scope of electrical development:-

Apart from one or two towns in the North Kanara District the whole of the District which solely depends on agriculture and forest produce, is backward. There is little likelihood of the agricultural pumping load being available as the rainfall throughout the district is abundant and certain. The principal industry in the District is fishing and fish curing ~~and~~ The export of timber and spices is the only trade of -

importance. The main demand for motive power is likely to come from rice mills, flour and oil mills, saw mills and weaving looms. The latter are at present hand driven and certain modifications in the existing looms or altogether new power looms may be necessary for conversion to electric drive. There is also scope for tinning of fruits, fish etc and other small scale cottage industries which can be started if cheap power is available. The electrical loads as surveyed, are likely to occur within the first five years after - electricity is made available to the public and hence the profit and loss figures given elsewhere in the report, will hold good for the fifth year.

5. Power houses and grouping of schemes:

In order that the ~~new~~ places which have been surveyed and listed in enclosure 1, may have an electric supply, the question of establishing power house at each of the places has been considered. Two of the places named Kumta and Honavar are, however, situated not far from each other and a combined power station for both these places has been suggested and this arrangement works out to be more economical than that of an individual station at each of these places. A combined scheme has, therefore, been prepared for the above two places.

Each of the schemes involves stepping up the voltage at the power house end for the purpose of transmission except that for the places named Gokarn and Sirsi where the voltage in the beginning will not be ~~se~~ stepped up with a view to reducing the first cost and distribution of electricity will be arranged for without any transformation. The details - relating to all the above schemes are given in the enclosures hereto. 263 15

6. Financial details:-

^{b3} Enclosure 2 gives financial details relating to the establishment of diesel electric stations as per ^{the} Scheme... The total initial cost of the scheme will amount to Rs.19,10,000. Additional expenditure will have to be incurred in the Sixth year /-

year for installing additional Sets at Karwar and Bhatkal. It will be seen that the electrification schemes of Karwar and Bhatkal may begin to pay from the fifth year whereas there are other schemes which may not become self-supporting in the fifth year, owing to the present inflated cost. The total loss involved in the fifth year will amount to Rs.16,784 and in the event of the scheme for Gokarn not being taken up at present, the figure may be reduced to Rs.9,256. Enclosures 3 to 8 give the forecast of the developments of the scheme over a period of ten years. It is likely that the scheme will become self-supporting, from the sixth year and the total loss until the scheme becomes self-supporting, will amount to Rs.3,56,218. It will be noted that allowance has been made in the revenue returns for reduction in tariff rates from the seventh ~~eight~~ year in the case of Karwar and Bhatkal and from the eighth year in the case of Kumta - Honavar and Sirsi schemes. The reduction in tariff rates shown is, however, tentative. The actual amount of reduction and the year from which it can be effected can only be finally decided on after the Scheme has been in operation for some 5 to 6 years. Enclosures 9 and 10 give separate estimated expenditure for individual schemes.

7. Technical Details:-

Each Diesel Electric Station will be equipped with two generating sets having output as given in the schedules and will be complete with controlling switchgear, inter-connecting cables, power house crane, water cooling arrangement fuel storage tanks etc.. For the economic transmission and distribution of energy, the station under serial Nos. 1, 3 and 5 will transmit power at 11,000 volts to various sub-stations which will be constructed within the distributing areas and the voltage at these places will be stepped down to 400/230 volts which will be the declared pressure for power and lighting. The remaining stations will have low voltage supply in the beginning with a view to economy.

Below copies of Finance Department note dated 6th December 1944 and subsequent proceedings.

No.6188/33-A.

Finance Department.
Bombay Castle, 29th September 1945.

Forwarded to the Revenue Department, General Department, Educational Department, Home Department and Public Works Department for information and guidance.

2. The Revenue Department is requested to take necessary action as suggested in Finance Department note dated 24th August 1945.

By order of the Governor of Bombay,


Junior Assistant Secretary to the Government of Bombay,
Finance Department.

24,

W.B.

Submitted for inform.

2. In view of para. 3 of F.D. O.R. P-22 dated 24-8-45, it is perhaps not necessary to forward copies of these notes to the local offices.

Levy

18-10-45

SMH
17/10
25/10

^{A.B.}
Mr. ^{A.B.} W.B. + A.E. (R) + (S)
Recd.

+ CR 18/10/45

Ch
24/10/45

Ref
19/10/45

Ykel
26/10/45

WB 6/10

Mr. - Mr. -
6/10
U.S. DEPARTMENT OF JUSTICE
7629/36
2 OCT 1945

32963

2-10-173

2/2
m.

Seen. (A+B)

Letter

25

No.Elg.118/3255

Office of the Special Officer(Electric Grid)
Old Custom House Yard, Fort,
Bombay, 4th October, 1945.

To

The Secretary to Government,
Public Works Department,
Bombay.

Subject:- Nursery Electrification Scheme for
Kanara District.

Adviser (R. & P.W.D.) desired during the course of a personal discussion sometime back, that I should submit to Government, a Nursery Electrification Scheme for certain important townships in the Kanara District. I accordingly forward herewith a detailed note on the Scheme and recommend that Government may be pleased to sanction the proposals. In the event of the Scheme being sanctioned, I request that in the Government Resolution which may issue, I may be authorised to place orders for power house plant and carry through the Scheme under the procedure which Government have decided to lay down in connection with the execution of the Nursery Electrification Schemes in the Ratnagiri District and electrification of certain villages in the Bulsar and Satara Talukas.

P.B. Ad -
Special Officer(Electric Grid).

Encl.- 1 Note with
Accompts.

AhK.

8058/0

7605/36

5. OCT. 1948

33/47

26.03(1) 5-10-44

El.Br.(I).

76053/36/33147.

P.W.Deptt.

Submitted.

17-26 2. Under instructions from A(R), the S.O.(El.Grid) has submitted a Nursery Electrification Scheme for certain towns and villages in the Kanara Dist. The scheme is detailed on pp. 1-20. The scheme covers electric supply to following places:-

<u>Name of place.</u>	<u>Generating station.</u>
1. Karwar)	Karwar.
2. Sunkeri village)	
3. Nandangadde ")	
4. Badd ")	
5. Gokarn.	Gokarn.
6. Kumta)	Kumta
7. Honavar)	
8. Sirsi	Sirsi
9. Bhatkal	Bhatkal.

10-17 3. The scheme is estimated to cost Rs. 19,00,000. Vide, enclosure 9. The anticipated revenue is Rs. 2,68,393 against the working cost of Rs. 1,37,423 plus depreciation and interest charges of Rs. 1,47,754 calculated at 3½% - Vide, enclosure 2. It is stated that the scheme as a whole will become self-supporting from the sixth year and the total loss until it becomes self supporting will amount to Rs. 356218-
A/p-3 p-15 vide enclosure, 8.

4. The basic cost of fuel and the basic tariff & rates adopted in working out the scheme are as under:-

<u>Basic cost of fuel.</u>	<u>Basic tariff rates.</u>
Rs. 90 per ton + 15% for 1st year.	6 As. per unit for lighting. 1½ As per unit for the first. 200 units of motive power. 1 anna per unit for all the addl. units plus a fixed charge of Rs. 1-12-0 per month, per H.P. connected.
Rs. 90 per ton + 10% - do - 2nd year.	
Rs. 90 per ton + 5% for 3rd year.	
Rs. 90 per ton for the 4th and subsequent years.	

5 vide enclosure 5 on p-9

The cost and rates mentioned above are the same as those adopted in the electrification scheme of ~~xxx~~ concentrated Rural Areas sanctd. in G.R. No. 6730/36(4), dated the 11-10-45.

5. The rate of depreciation and interest adopted in this scheme viz. 3½% is also the same as is adopted in the scheme for concentrated rural areas.

- do -
p 30 u G-2

6. Before the scheme is considered further the papers may perhaps be refd. u.o. to the El. Engr. to

7605/36/33147

Govt. for his remarks on the scheme in general and specially reg: technical details of the scheme.

Thro' D.E.(9)

183
31-10-45.
✓ 11/11
31/10/45

request
u.o. to El. Engr. to Govt. 11/11
2-11-45

D.S.

Two to L. Engr.

VPA.
31/10-.

29

Below U.O.R.No.7605/36/33147 dat
the 2nd November 1945, from Government
in the Public Works Department.

No. *242u 31*
37.10 of 1945
Bombay, .29⁹ November 1945.

Returned, with compliments.

2. With reference to the scheme put forward, I have the following remarks to make:-

(1) The size of the generating plants at Karwar, Kumta, Sirsi and Bhatkal are not, in accordance with the standard practice, capable of meeting the peak loads of the stations, when any repairs or maintenance works have to be carried out:

	<u>Year.</u>	<u>Estimated maximum demand.</u>	<u>Sets proposed</u> <i>p.3</i>
Karwar.	<i>3rd</i> <i>p.5</i> 2nd. → 7th. →	63 K.W. 98 K.W.	1 - 90/100 K.W. 1 - 45/50 K.W.
Kumta.	<i>p.9</i> 3rd. → 10th. →	92 K.W. 150 K.W.	1 - 150 K.W. 1 - 90/100 K.W.
Sirsi.	<i>p.11</i> 4th. → 10th. →	53 K.W. 85 K.W.	1 - 90/100 K.W. 1 - 45/50 K.W.
Bhatkal.	<i>p.13</i> 2nd. → 7th. →	65 K.W. 107 K.W.	1 - 90/100 K.W. 1 - 45/50 K.W.

The Dharwar Electric Supply Co.Ltd. which has been operating for 15 years and is situated in the same Division as the project in question, has shown a steady increase in units sold upto 1940; but the units sold do not compare with the estimated figures per head of population given for the Karwar, Kumta, Sirsi and Bhatkal scheme, although Dharwar has the advantage of supply to the Karnatak College, Borstal School and Municipal installations.

Dharwar - Population 47,992:

<u>Year of operation.</u>	<u>Consumers connected.</u>	<u>Units sold.</u>
1st.	194	30,716.
2nd.	318	100,599.
3rd.	387	172,094.
4th.	487	218,747.
5th.	591	210,914.
6th.	551	224,822.
7th.	640	228,912.
8th.	665	254,416.
9th.	745	265,578.
10th.	830	281,609.

The sale of units in the 5th year of working amounts to approximately 4-1/2 units per head of population. On the same basis the figures given in "enclosure 1" (page 1) would be:

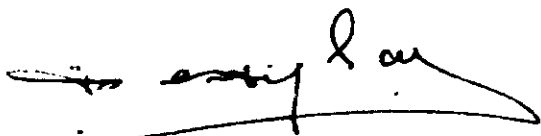
A.I. P.I.

	<u>Population.</u>	<u>Units sold as estimated.</u>	<u>Units that would be sold at $4\frac{1}{2}$ per head of population.</u>
--	--------------------	---------------------------------	--

Karwar.	20,662.	199,606.	92,979.
Gokarn.	10,082.	73,798	45348. ✓
Kumta.	21,405.	327,086.	96,323.
Sirsi.	10,451	144,721.	46,930. ✓
Bhatkal.	10,718	245,957.	48,231.

(2) Working Cost: It is not known on what basis the working cost has been calculated or what items have been included other than fuel. Presumably, maintenance has been allowed for and also supervision. The working cost appears to be low compared with Dharwar.

(3) Depreciation and Interest: I consider it would be safer to provide at the rate of $4-1/2\%$ for depreciation, specially when using diesel engines. Unless extremely efficient maintenance is carried out, $3-1/2\%$ will not cover expenditure on repairs and replacements.



Electrical Engineer to Govt.

2. From the remarks of the El. Engr. to Govt. ¹¹⁻²⁹⁻³⁰ para. 2(1) of his note it will be seen that the estimate of the S.O. (El. Grid) for the sale of energy is too optimistic. On the basis of the percentage reduction ¹⁻³⁰ estimated by the El. Engr. in the revenue figures of the S.O. for the fifth year the figures for anticipated net profit or loss in the fifth year shown in the Statement on p. 3 ante will be as shown below :-

<u>Generating Stn.</u>	<u>S.O.'s figure.</u>	<u>Figure on the basis of the percentage reduction estimated by the El. Engr.</u>
		Rs.
1. Karwar	+ 54	- 33,592
2. Gokarn.	-7,528	- 15,685
3. Kumta & Honavar	-6,983	- 68,730
4. Sirsi	-3,336	- 32,207
5. Bhatkal	+1,009	- 44,150
	-----	-----
	- 16,784	-1,94,364

Further calculations for the 6th to the 10 years on the basis of the units* that would be sold per head of population calculated for the corresponding years for Dharwar show that the scheme will not be working at profit even in the tenth

3. Reg: para. 2(2) of the El. Engr.'s. note it is not known on what basis the working cost has been calculated by the S.O. The S.O. may be requested to elucidate the point.

Remarks of the El. Engr. to Govt. in para. 2(3) of his note reg: depreciation are apparently based on the statement made in ¹⁻²⁷ paras. 3 and 5 of the O.N. dated the 31-10-45 to the effect that the depreciation is calculated along with interest at 3½%. It is regretted that this statement was made ^{through} ~~this~~ misapprehension. It is the interest only which is calculated at 3½%. Excluding the amount of interest provided in col. 7 of the statement on p. 3 ante it is observed that the percentage of the

El.Br.(I).

P. W. Dept.

Submitted with ref. to the O.N. dated the

31-10-45

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6th year- 5 units
7th year- 5 units

8th year- 5 units
9th year- 5½ units
10th year- 6 units

depreciation which is provided in each case
4.1 to 4.4 per cent of the ^{capital} ~~actual~~ expendi-

ture.

The S.O. may see the papers u.o. for further remarks
with ref. to para. 2(1) of the El. Engr's. note and paras. 2
and 3 above.

ASB
22-12-45

CU
23-12-45

VPA.
22/12-.

(15-1-46

26/12

agent u.o. to the S.O. (u.o. and) 27-12-45 2-5.

OFFICE OF THE SPECIAL AGENT IN CHARGE	
WATER NO.	2705
Date	27-12-45

52
1-KARWAK (Badd, Nandangadde & Sunkeri).

PRELIMINARY ESTIMATE FOR TOWN ELECTRIFICATION.

Make of the
engine. National.

Power House Comprising, ^{1-90/100)}
~~1-45/50~~ , K.V. 3 Phase. 50 Cycle. 4 Wires.
400/440 Volts Diesel Engine-Alternator Sets. (11 KV Transmission).

Capital Expenditure.

Power House.

- | | | | |
|---|--|---------|--------|
| 1 | Power House Building. | ... RS. | 30,800 |
| | Cost of foundations for Diesel Sets. | RS.- | 1,500 |
| 1 | Fuel oil storage tank (with piping and semi-rotary pump) <u>3000</u> galls. | RS. | 5,000 |
| 1 | <u>Five</u> Ton overhead hand operated crane including Gantry girders and rails. | ... RS. | 6,600 |

or

~~Brickwork Block.~~

- | | | | |
|---|---|---------|--------|
| 1 | Concrete cooling water Tank with pipe work & small overhead after-run Tank. | ... RS. | 4,500 |
| | | 750 | |
| | | RS. | 48,400 |
| | | RS. | 48,400 |
- 1-90/100 and 1-45/50 K.V. 500 & /R.P.M.

400 / 440 Volts. 3 Phase.

50 Cycles. 4 Wires.

Diesel Engine alternator sets including standard accessories and spares @ RS. RS. 83,730

- | | | | |
|---|---|-----|-------|
| 2 | ~~2~~ Circulating water motor pumping sets | RS. | 3,000 |
|---|---|-----|-------|

- | | | | |
|---|---|---------|-------|
| 1 | Compressed air starting equipment and receiver. | ... RS. | 4,370 |
|---|---|---------|-------|

- | | | | |
|---|---------------------------------------|-----|-------|
| 1 | Transformer and switchgear { 75 KVA } | RS. | 8,190 |
| 1 | " " " " } | | |

- | | | | |
|----|---|---------|-------|
| 1 | Open flat back type ^{Sindanyo} ~~switchboard~~ panel switchboard comprising | | |
| | <u>Two</u> alternator control panels | | |
| 2. | <u>Two</u> circuit feeder panels and | | |
| | <u>One</u> street lighting and power House lighting panel and Synchronising bracket. | ... RS. | 8,500 |

- | | | | |
|---|--|---------|-------|
| 1 | Set Interconnecting cables between Generators and Switchboard and between switchboard and terminal pole structure outside the Power House. | ... RS. | 1,200 |
|---|--|---------|-------|

Approximate cost of Erection and supervision. RS. 7,500

Miscellaneous such as Fitters and small workshop tools. RS. 5,000
RS. 1,21,490 RS. 1,21,490

Grand Total . . RS. 1,69,890

KAHWAR.

<u>Transmission and Distribution.</u>		<u>Ruppes</u>
4- Miles combined Transmission and Distribution using wooden poles @ Rs. 10,000/- per mile.		40,000.
Miles Transmission using wooden poles @ Rs. per mile.		
16- Miles Distribution using wooden poles @ Rs. 7,000 per mile.		1,12,000.
2-30 ~~1000~~ K.V.A. Stepdown Transformer.		4,400.
1-50 K.V.A. " "		2,550.
12- Nos. 11 K.V. Lightning Arrestors @ Rs. 250 each.		3,000.
3- Nos. 11 K.V. T.P. Gang operated air break switch & fuses @ Rs. 1000 .		3,000.
1- No. 11 K.V. T.P. hook operated isolators and fuses @ Rs. 300 .		300.
3- Nos. Substation Structures @Rs. 600.		1,800
3- Sets. L.T. Switchgear for the control of Transformers & outgoing distributors @ Rs. 1700 .		5,100.
235- Nos. of St. lights and fittings @ Rs. 20 .		4,700.
12- Sets. L.T. Lightning Arrestors @ Rs. 100 each set.	~~12~~	1,200.
1175- Nos. Service connections @ Rs.20.		23,500.
64- Bazar services @ Rs. 40.		2,560.
1175 -H.S.Meters @ Rs. 38.		4,650.
8 - Energy Meters for P.S. @ Rs.100.		800.
8 - Power Services @ Rs.150.		1,200.
2 - Lineman's Tool boxes @ Rs. 2000.		4,000.
Testing Apparatus		5,000.
Erection of Sub-Station.		1,500.
	Rs.....	2,61,260

Abstract:

Power House equipped with necessary machinery, Building etc.	Rs.1,69,890.
Transmission & Distribution	Rs.2,61,260.
Contingencies.	Rs. 6,850

Total Capital Rs.4,38,000

Depreciation & Interest.

Capital Amount: Amount of —————
 Rs. : Depre. by: ~~Sinking~~
 : Sinking : ~~Sinking~~
 : Fund Method ~~Method~~
 : Rs. : Rs.

Power House.

Power House Building, Fuel &
 Storage and water cooling
 tanks including pumping sets
 etc. (~~Station~~ S.F.O.03722) 76,540 2,848

 } K.W. Diesel Engine
 } generating sets 400/
 440 Volts, 3 phase, 50 cycles
 with starting equipment etc.
 (~~Station~~ S.F.O.05377) 93,350 5,019

Transmission & Distribution

Transmission & Distribution
 (~~Station~~ S.F.O.03722) 1,52,000 5,657

Meters for House Services
 and power.
 (~~Station~~ S.F.O.05377) 45,450 2,443

Transformers, switchgears etc.
 (~~Station~~ S.F. O.03722) 63,810 2,375

 18,342

Interest on Capital Rs. 4,38,000
 @ $3\frac{1}{2}\%$ per annum. ... Rs. 15,330

M Depreciation & Interest. ... Rs. 33,672
 =====

Units Generated.

Probable Sale of Units in Case of
 Non Industrial load:- 1,27,411 Units.

Probable Sale of Units in case of
 Industrial load:- 72,195 "

Units required for cooling water
 Motor pumping set. :- 8,760 "

Total..... 2,08,366

Plus loss due to Transmission and
 distribution say ~~about~~ 15 % 31,254

 2,39,620

Total generation will be ... Units.

Say 2,40,000 Units.

Cost of Fuel.

Fuel consumption per unit generated = $\frac{0.43}{0.746 \times 0.89} = 0.65 + 33\frac{1}{3} = 0.86$ lbs.

Cost of Fuel Oil per unit generated = $\frac{0.86 \times 1440}{2240} = 0.55$ anna.
 Fuel Oil @ Rs. 90 per Ton. =

Total quantity of Fuel oil required for the year. = $\frac{0.86 \times 2,40,000}{2240} = 92$ tons.

Working cost under this heading. = 90 x 92 = Rs. 8,280

List of Operating Staff.

Power House.

1 Assistant Engineer.	Rs.150.
1 Elec. & Mech.Foreman.	Rs.100.
3 Engine Attendants.	Rs.120.
3 Switchboard Attendants.	Rs.120.
3 Coolies.	Rs. 75.
	Rs.565 i.e. 6,780 per yr.

Transmission & Distribution.

1 Line Foreman	Rs.100.
3 Linemen.	Rs.120.
3 Coolies.	Rs. 75.
1 Meterman.	Rs. 40.
	Rs.335 i.e. 4020 per yr.

Office Staff:-

1 Asstt. Accountant, Cashier and Head Clerk.	Rs.100.
2 Clerks.	Rs. 80.
1 Chaprasi.	Rs. 20.
	Rs.200 i.e. 2400 per yr.

NP. - 2 the office expenses i.e. Rs.1200 will be borne by Gokarn St.

KARWAR.

Cost of Lubricating Oil.

Consumption .. 1000 gallons per year.

Cost per unit generated @ Rs. 3 per gallon. = $\frac{1000 \times 48}{240000} = 0.20$ anna

Working cost under this heading = $\frac{1000 \times 3}{240000} = \text{Rs. } 3,000.$

Cost of Operation & Supervision.
(Including cost of Trans. to Distri.)

Power House Staff -	Rs. 6,780 P.A.
Transmission & Distribution -	Rs. 4,020 P.A.
Office Staff. -	Rs. 1,200 P.A.
Head Office Supervision and Management say .. -	Rs. 500 P.A.
Total..Rs..	12,500 per annum.

Cost per unit generated will be = $\frac{12500 \times 16}{240000} = 0.83$ anna.

Water and Stores.

Cost per unit say - 0.10 anna

Working cost under this heading = $\frac{0.10 \times 240000}{16} = \text{Rs. } 1,500.$

Repairs & Maintenance.

Cost per unit say - 0.12 anna.

Working cost under this heading = $\frac{0.12 \times 240000}{16} = \text{Rs. } 1,800$

Incidentals & Insurance.

Cost per unit 0.10 anna.

Working cost under this heading = $\frac{0.10 \times 240000}{16} = \text{Rs. } 1,500.$

Running Cost.

	Rs.	Working cost in: Cost in annas per unit generated.
Fuel Oil.	8,280	0.55
Lubricating Oil.	3,000	0.20
Operation and Supervision.	12,500	0.83
Water and Stores.	1,500	0.10
Repairs and Maintenance.	1,800	0.12
Incidentals and Insurance.	1,500	0.10
Total Working Cost.. Rs.	28,580	1.90

Fixed Charges.

Interest on capital of Rs. 4,38,000 @ $3\frac{1}{2}\%$ F.A. is
Rs. 15,330

Depreciation by sinking fund method will be Rs. 18,342

Total Depre. and Interest. Rs. 33,672

Fixed charge per unit generated will be = $\frac{33672 \times 16}{240000} = 2.24$ annas.

delivered
i.e. Total/~~Working~~ cost per unit = $1.90 + 2.24 = 4.14$ annas.

Annual Revenue.

235 ~~200~~ Municipal St. lights @ Rs.36/- P.A.each.- Rs. 8,460

64 ~~100~~ Bazar lights @ Rs.30/- per lamp P.A. - Rs. 1,920

General domestic lights @ as. per unit.
(~~5640~~ 65,165 units). - Rs. 24,436

Government offices & Buildings etc. @as.6
per unit (33,940 units.) - Rs. 12,727

Annual meter Rentals@ Rs.6/- P.A.(1175) - Rs. 7,050

Cinema - @ 1½ as. per unit (10950) - Rs. 855

Motive Power -

@ 1½ as. per unit - ~~50~~ 72195 units. - Rs. 5,640
@ 1 as. " " - Nil " - Rs. -

Fixed charge @ Rs.2½/- P.A. per H.P.(58 H.P.)Rs. 1,218

Total Revenue ... Rs. 62,306

Total Revenue - Rs. 62,306

Less Working Cost. - Rs. 28,580

Balance.... Rs. 33,726

Less Depre. & Interest.Rs. 33,672

Nett Profit/Loss in the
year of working.)Rs. + 54

45

①

2 GOKARN (N.KANARA) (M.P.S.)
 Supply- Medium pressure only.
PRELIMINARY ESTIMATE FOR TOWN ELECTRIFICATION.

Make of the
 engine. National.

Power House Comprising. 2-45/50 K.W. 3 Phase. 50 Cycle. 4 wires.
 400/440 Volts Diesel Engine-Alternator Sets.

Capital Expenditure.

Power House.

- | | | | | |
|---|--|-----|-----|--------|
| 1 | Power House Building. | ... | RS. | 19,300 |
| | Cost of foundations for Diesel Sets. | RS. | | 1,300 |
| 1 | Fuel oil storage tank (with piping and semi-rotary pump) 3000 galls. | RS. | | 5,000 |
| 1 | 3 Ton overhead hand operated crane including Gantry girders and rails. | ... | RS. | 5,800 |

~~or~~
~~Pulley Block.~~

- | | | | | |
|---|---|-----|--------|------------|
| 1 | Concrete cooling water Tank with pipe work & small overhead after-run Tank. | ... | RS. | 3,500 |
| | 2.45/50 K.W. 750 R.F.M. | RS. | 34,900 | RS. 34,900 |
| | 400/440 Volts. 3 Phase. | | | |
| | 50 Cycles. 4 Wires. | | | |

- | | | | | |
|---|---|-----|--------|------------|
| | Diesel Engine alternator sets including standard accessories and spares @ RS. _____. | ... | RS. | 57,500 |
| 2 | Circulating water motor pumping sets | RS. | 2,000 | |
| 1 | Compressed air starting equipment and receiver. | ... | RS. | 2,500 |
| 1 | Transformer and switchgear { | | RS. | |
| 1 | " " " } | | | |
| 1 | Open flat back type ~~sheet steel~~ Sindanyo panel switchboard comprising
Two alternator control panels
2-Two circuit feeder panels and
One street lighting and power House lighting panel and Synchronising bracket. | ... | RS. | 8,500 |
| 1 | Set Interconnecting cables between Generators and Switchboard and between switchboard and terminal pole structure outside the Power House. | ... | RS. | 800 |
| | Approximate cost of Erection and supervision. | ... | RS. | 5,000 |
| | Miscellaneous such as Fitters and small workshop tools. | ... | RS. | 2,000 |
| | | RS. | 78,300 | RS. 78,300 |

Grand Total ... RS. 113,200

VIS.

<u>Transmission and Distribution.</u>		<u>Ruppes</u>
Miles combined Transmission and Distribution using wooden poles @ Rs. per mile.		
Miles Transmission using wooden poles @ Rs. per mile,		
3-	Miles Distribution using wooden poles @ Rs. 7,000 per mile.	21,000
	1-75 K.V.A. Stepdown Transformer.	-
	1-50 K.V.A. " "	-
	Nos. 11 K.V. Lightning Arrestors @ Rs. each,	-
	Nos. 11 K.V. T.F. Gang operated air break switch & fuses @ Rs.	-
	No. 11 K.V. T.F. hook operated isolators and fuses @ Rs.	-
	Nos. Substation Structures @Rs.	-
	Sets. L.T. Switchgear for the control of Transformers & outgoing distributors @ Rs.	0
65	Nos. of St. lights and fittings @ Rs. 20	1,300
6-	Sets. L.T. Lightning Arrestors @ Rs. 100 each set.	600
500-	Nos. Service connections @ Rs. 20	10,000
50-	Bazar services @ Rs. 40	2,000
500-	H.S. Meters @ Rs. 38.	19,000
	1- Energy Meters for P.S. @ Rs. 100	100
	1- Power Services @ Rs. 150	150
	1- Lineman's Tool boxes @ Rs.	2,000
	Testing Apparatus	2,000
	Erection of Sub-Station.	
	Rs.	58,150

Abstract:

Power House equipped with necessary machinery, Building etc.	Rs.	1,13,200
Transmission & Distribution	Rs.	58,150
Contingencies.	Rs.	3,650

Total Capital Rs. 1,75,000

Depreciation & Interest.

Capital Amount: Amount of: ~~Amount of~~
RS. : Depre. by ~~Depre.~~
: Sinking ~~:-~~
: Fund Method ~~Method~~
: RS. : RS.

Power House.

Power House Building, Fuel &
Storage and water cooling
tanks including pumping sets
etc. (~~xxxxxx~~ S.F.O.03722) 50,050 1,862

2.45/50 } K.W. Diesel Engine
generating setr 400/
440 Volts, 3 phase, 50 cycles
with starting equipment etc.
(~~xxxxxx~~ S.F.O.05377) 63,150 3,395

Transmission & Distribution

Transmission & Distribution
(~~xxxxxx~~ S.F.O.03722) 21,000 781

Meters for House Services
and Power. 19,100 1,027
(~~xxxxxx~~ S.F.O.05377)

Transformers, switchgears etc.
(~~xxxxxx~~ S.F. 0.03722) 18,050 671

7,736

Interest on Capital Rs. 1,75,000
@ 3½% per annum. ... Rs. 6,125
x Depreciation & Interest. ... Rs. 13,861
=====

Units Generated.

Probable Sale of Units in Case of
Non Industrial load:- 44,998 Units.

Probable Sale of Units in case of
Industrial load:- 28,800 "

Units required for cooling water
Motor pumping set. :- 8,760 "

Total.....

82,558

Plus loss due to Transmission and
Distribution say ~~about~~ 10 %

8,442
91,000 Units.
Total generation will be ...

=====

Cost of Fuel.

Fuel consumption per unit generated = $\frac{0.47}{0.746 \times 0.88} = 0.71 + 33-1/3\%$
0.94

Cost of Fuel Oil per unit generated
Fuel Oil @ Rs. 90/- per Ton. = $\frac{0.94 \times 1440}{2240} = 0.60$ anna

Total quantity of Fuel oil required
for the year. = $\frac{0.94 \times 91,000}{2240} = 38$ tons.

Working cost under this heading. = $90 \times 38 = \text{Rs. } 3,420/-$.

G O K A R NList of operating Staff:-Power House

1 Elec. & Mech. Foreman	Rs. 100/- p.m.
3 Engine Attendants @ Rs. 40/- each.	Rs. 120/- p.m.
3 Switchboard Attendants @ Rs. 40/- each.	Rs. 120/- p.m.
3 Coolies @ Rs. 25/- each	Rs. 75/- p.m.

Rx.	Rs. 415/- p.m.
i.e.	Rs. 4980/- p.m.

Distribution

1 Lineman @ Rs. 40/- each	Rs. 40/- p.m.
2 Coolies @ Rs. 25/- each	Rs. 50/- p.m.
1 Meterman @ Rs. 40/- each	Rs. 40/- p.m.

	Rs. 130/- p.m.
i.e.	Rs. 1560/- per annum.

Office Staff:

1 Asstt. Accountant Cashier	
& Hd Clerk	Rs. 100/- p.m.
2 Clerks ..	Rs. 80/- p.m.
Prasi ..	Rs. 20/- p.m.

	Rs. 200/- p.m.
i.e.	Rs. 2400/- per annum.

Cost of Lubricating Oil.

Consumption .. $0.29 + 20\% = \frac{0.35 \times 8760}{8} = 383$ gallons
 Cost per unit generated @ Rs. 3 per gallon. = $\frac{383 \times 48}{91000} = 0.22$ anna.
 Working cost under this heading = $383 \times 3 = 1149$.

Cost of operating & Supervision.

(Including that of Trans. to Distri.)

Power House Staff - Rs.4,980.

Transmission & Distribution - Rs.1,560.

Office Staff. - Rs.1,200.

Head Office Supervision and Rs. 250

Management say
 To cover up the charges of ~~Rs. 2,450~~ Rs. 8,240
 visits of the Engr. & other staff: Rs. 8,250 per annum.

Cost per unit generated will be = $\frac{8250 \times 16}{91000} = 1.45$ annas.

Water and Stores.

Cost per unit ~~say~~ say - $\frac{511 \times 16}{91000} = 0.09$ annas.

Working cost under this heading = Rs.511.

Repairs & Maintenance.

Cost per unit say - $\frac{682 \times 16}{91000} = 0.12$ anna.

Working cost under this heading = ~~Rs.511~~ Rs.682.Incidentals & Insurance.

Cost per unit $\frac{568 \times 16}{91000} = 0.10$ anna.

Working cost under this heading = Rs.568.

Running Cost.

	Working cost in: Cost in annas per	
	Rs.	unit generated.
Fuel Oil.	3420	0.60
Lubricating Oil.	1149	0.22
Operation and Supervision.	8250	1.45
Water and Stores.	511	0.09
Repairs and Maintenance.	682	0.12
Incidentals and Insurance.	568	0.10
Total Working Cost..	Rs. 14580	2.58

Fixed Charges.

Interest on capital of Rs. 1,75,000 @ $3\frac{1}{2}\%$ P.A. is
 Rs. 6,125

Depreciation by sinking fund method will be Rs. ... 7,736

Total Depre. and Interest. Rs. 13,861

Fixed charge per unit generated will be = $\frac{13861 \times 16}{91000} = 2.43$ annas.

i.e. Total Distributing cost per unit = $2.58 + 2.43 = 5.01$ annas.

Annual Revenue.

65 ~~200~~ Municipal St. lights @ Rs. 36/- P.A. each. - Rs. 2,340.

50 ~~100~~ Bazar lights @ Rs. 30/- per lamp P.A. - Rs. 1,500.

General domestic lights @ as. per unit.	)	
(~~5040~~ 27880 units).	}	- Rs. 10,455
including	}	
Government offices & Buildings etc. @ as.	}	
per unit (units.)	}	- Rs.

Annual meter Rentals @ Rs. 6/- P.A. () - Rs. 3,000

Cinema - @ 1½ as. per unit (10940) - Rs. 855

Motive Power -

@ 1½ as. per unit - ~~50~~ 24000 units.	- Rs.	1,875
@ 1 as. " " - 4800 "	- Rs.	300

Fixed charge @ Rs. 21/- P.A. per H.P. (28 H.P.) Rs. 588

Total Revenue ... Rs. 20,913

Total Revenue - Rs. 20,913

Less Working Cost. - Rs. 14,580

Balance.... Rs. 6,333

Less Depre. & Interest Rs. 13,861

Nett ~~Profit~~ / Loss in the } 7,528
year of working.) Rs.

3 Kumta & Honavar Combined Electrification.
Power House at Kumta. 57
PRELIMINARY ESTIMATE FOR TOWN ELECTRIFICATION.

Make of the
engine. National.

Power House Comprising. 1-150)
1-90/100) K.W. 3 Phase, 50 Cycle 4 Wires.
400/440 Volts Diesel Engine-Alternator Sets. (11 KV. Transmission).

Capital Expenditure.

Power House.

1 Power House Building. Rs. 36,000.
1 Main Receiving Station at Honavar. Rs. 10,000.
Cost of foundations for Diesel Sets. Rs. 2,500.

1 Fuel oil storage tank (with piping
and semi-rotary pump) 10000 galls. Rs. 10,000.

1 Five Ton overhead hand operated
crane including Gantry girders
and rails. ... Rs. 6,600.

~~or~~
~~Public Works~~

1 Concrete cooling water Tank with
pipe work & small overhead
after-run Tank. ... Rs. 6,500
Rs. 71,600 Rs. 71,600.

1-150 & 1-90/100 K.W. 600 R.F.M.
400/440 Volts. 3 Phase.
50 Cycles. 4 Wires.

Diesel Engine alternator sets
including standard accessories
and spares @ Rs. _____. ... Rs. 1,24,000

2 Circulating water motor pumping sets. Rs. 4,000

1 Compressed air starting equip-
ment and receiver. Rs. 4,370

2 Transformer and switchgear { 150 KVA } Rs. 14,300
" " " { each }

1 Open flat back type Sindanyo
panel switchboard comprising
Two alternator control panels
2 Two circuit feeder panels and
One street lighting and lower
House lighting panel and Synchroni-
sing bracket. Rs. 19,000

1 Set Interconnecting cables
between Generators and Switch-
board and between switchboard
and terminal pole structure
outside the Power House. Rs. 1,500

Approximate cost of Erection and
supervision. Rs. 10,000

Miscellaneous such as Fitters
and small workshop tools. ... Rs. 5,000
Rs. 1,82,170 Rs. 1,82,170

Grand Total ... Rs. 2,53,770

<u>Transmission and Distribution.</u>		<u>Rupees</u>
5	Miles combined Transmission and Distribution using wooden poles @ Rs. 10,000 per mile.	50,000
12	Miles Transmission using wooden poles @ Rs. 7,500 per mile.	90,000
16½	Miles Distribution using wooden poles @ Rs. 7,000 per mile.	1,15,500
	4-75 K.V.A. Stepdown Transformer.	
	~~1x50KxVxx~~ " "	12,000
	" "	
15	Nos. 11 K.V. Lightning Arrestors @ Rs. 250 each.	3,750
6	Nos. 11 K.V. T.P. Gang operated air break switch & fuses @ Rs.1000. .	6,000
2	Nos. 11 K.V. T.I. hook operated isolators and fuses @ Rs. 300 .	600
3	Nos. Substation Structures @Rs.600	1,800
4	Sets. L.T. Switchgear for the control of Transformers & outgoing distributors @ Rs. 2,500 .	10,000
440	Nos. of St. lights and fittings @ Rs.20 .	8,800
15	Sets. L.T. Lightning Arrestors @ Rs. 100 each set.	1,500
1600	Nos. Service connectons @ Rs. 20	32,000
275	Bazar services @ Rs.40.	11,000
1600	H.S.Meters @ Rs.38.	60,800
11	Energy Meters for P.S. @ Rs. 100.	1,100
11	Power Services @ Rs. 150.	1,650
4	Lineman's Tool boxes @ Rs. 2,000.	8,000
	Testing Apparatus	5,000
	Erection of Sub-Station.	2,500
RS.....		4,22,000

Abstract:

Power House equipped with necessary machinery, Building etc.	Rs. 2,53,770
Transmission & Distribution	Rs. 4,22,000
Contingencies.	Rs. 9,230

Total Capital Rs. 6,85,000

Depreciation & Interest

Capital Amount: Amount of: ANNUAL
Rs. : Depre. by: 10%
: Sinking : 5%
: Fund Method : 10%
: Rs. : Rs.

Power House.

Power House Building, Fuel &
Storage and water cooling
tanks including pumping sets
etc. (~~Rs. 1,17,900~~ S.F.O.03722) 1,17,900 4,388

1 - 150 } K.W. Diesel Engine
1-90/100 } generating sets 400/
440 Volts, 3 phase, 50 cycles
with starting equipment etc.
(~~Rs. 1,35,870~~ S.F.O.05377) 1,35,870 7,305

Transmission & Distribution

Transmission & Distribution
(~~Rs. 2,55,500~~ S.F.O.03722) 2,55,500 9,509

Meters for House Services
and Power. 61,900 3,328
(~~Rs. 2,55,500~~ S.F.O.05377) ~~2,55,500~~ ~~2,55,500~~

Transformers; switchgears etc.
(~~Rs. 1,04,600~~ S.F.O.03722) 1,04,600 3,893

28,423

Interest on Capital Rs.6,85,000
@ 3 1/2% per annum. ... RS. 23,975

& Depreciation & Interest. ... RS. 52,398
=====

Units Generated.

Probable Sale of Units in Case of
Non Industrial load:- 1,42,554 Units.

Probable Sale of Units in case of
Industrial load:- 1,84,532 "

Units required for cooling water
Motor pumping set. :- 13,140 "

Total..... 3,40,226

Plus loss due to Transmission and
Distribution say about 15 % 51,034'

Total generation will be ... 3,91,260 Units.
say =====
3,91,300 units.

Cost of Fuel.

Fuel consumption per unit generated = $\frac{0.40}{0.746 \times .895} = .6 + 33 \frac{1}{3} \% = 0.8$ lb

Cost of Fuel Oil per unit generated $\frac{0.8 \times 1440}{2240} = 0.51$.
Fuel Oil @ Rs. 90 per Ton. =

Total quantity of Fuel oil required
for the year. = $\frac{0.8 \times 391300}{2240} = 140$ tons.

Working cost under this heading. = 140 x 90 = Rs.12,600.

KUMTA & HONAVAR.

List of operating staff:-Power House.

1. Assistant Engineer	Rs. 150.
1 Electrical and Mechanical Foreman.	Rs. 100.
3 Engine Attendants	Rs. 120.
3 Switchboard attendants	Rs. 120.
3 Coolies	Rs. 75.
	Rs. 565 i.e. Rs.6,780 P.A.

Transmission and Distribution.

2 Line foreman	Rs. 200.
4 Linemen	Rs. 160.
4 Coolies	Rs. 100.
2 Meterman	Rs. 80.
	Rs. 540. i.e. Rs.6,480 P.A.

Office Staff.

2 Assistant Accountant, Cashier and Head Clerk.	Rs. 200.
4 Clerks.	Rs. 160.
2 Chaprasi.	Rs. 40.
	Rs. 400 i. e. Rs.4,800 P.A.

Cost of Lubricating Oil.

Consumption 1182 Gallons.

Cost per unit generated @ Rs. 3 per gallon := $\frac{1182 \times 48}{391300} = 0.14$ annaWorking cost under this heading = $1182 \times 3 = \text{Rs. } 3,546.$ Cost of Operating & Supervision.

(Including cost of Trans. to Distri.)

Power House Staff - Rs.6780.

Transmission & Distribution - Rs.6480.

Office Staff. - Rs.4800.

Head Office Supervision and

Management say .. - Rs.500.

Total..Rs.. 18,560 per annum.

Cost per unit generated will be $= \frac{18560 \times 16}{391300} = 0.76$ anna.Water and Stores.

Cost per unit say - 0.08 anna.

Working cost under this heading = $\frac{0.08 \times 391300}{16} = \text{Rs. } 1,956.$ Repairs & Maintenance.

Cost per unit say - 0.12 anna.

Working cost under this heading = $\frac{0.12 \times 391300}{16} = \text{Rs. } 2,934.$ Incidentals & Insurance.

Cost per unit - 0.08 anna.

Working cost under this heading = $\frac{0.08 \times 391300}{16} = \text{Rs. } 1,956.$ Running Cost.

	Working cost in: Cost in annas per
	Rs. : unit generated.
Fuel Oil.	12,600 0.51
Lubricating Oil.	3,546 0.14
Operation and Supervision.	18,560 0.76
Water and Stores.	1,956 0.08
Repairs and Maintenance.	2,934 0.12
Incidentals and Insurance.	1,956 0.08
Total Working Cost.. Rs.	41,552 1.69

Fixed Charges.Interest on capital of Rs. 6,85,000 @ $3\frac{1}{2}\%$ P.A. is
Rs..... 23,975

Depreciation by sinking fund method will be Rs... 28,423

Total Depre. and Interest. Rs..... 52,398

Fixed charge per unit generated will be $= \frac{52398 \times 16}{391300} = 2.14.$ i.e. Total Distributing cost per unit = $1.69 + 2.14 = 3.83$ annas.

Annual Revenue.

440 ~~300~~ Municipal St. lights @ Rs.36/- P.A.each.- Rs. 15,840.

275 ~~1000~~ Bazar lights @ Rs.30/- per lamp P.A. - Rs. 8,250.

General domestic lights @ as. per unit.	}	- Rs.
(~~5540~~ 95,361 units).		
Government offices & Buildings etc. @as.	}	- Rs. 35,760.
per unit (including units.)		

Annual meter Rentals@ Rs.6/- P.A.(1600) - Rs. 9,600

Cinema - @ 1½ as. per unit (7,115) - Rs. 558

Motive Power -

@ 1½ as. per unit - 50	1,67,172 units.	- Rs. 13,060
@ 1 as. " " -	17,360 "	- Rs. 1,085

Fixed charge @ Rs.21/- P.A. per H.P.(134 H.P.)Rs. 2,814

Total Revenue ... Rs. 86,967

Total Revenue - Rs. 86,967

Less Working Cost. - Rs. 41,552

Balance.... Rs. 45,415

Less Depre. & Interest.Rs. 52,398

Nett Profit/Loss in the
year of working.)Rs.- 6,983

(Medium Pressure Supply only).

PRELIMINARY ESTIMATE FOR TOWN ELECTRIFICATION.Make of the
engine. National.

Power House Comprising. $\left. \begin{array}{l} 1-90/100 \\ 1-45/50 \end{array} \right\}$ K.W. 3 Phase, 50 Cycle, 4 Wires.
400/440 Volts Diesel Engine-Alternator Sets.

Capital Expenditure.Power House.

- | | | | |
|---|---|---------|--------|
| 1 | Power House Building. | ... RS. | 30,800 |
| | Cost of foundations for Diesel Sets. | RS. | 1,500 |
| 1 | Fuel oil storage tank (with piping and semi-rotary pump) <u>3000</u> galls. | RS. | 5,000 |
| 1 | Five Ton overhead hand operated crane including Gantry girders and rails. | ... RS. | 6,600 |

~~42~~
Pulley Block.

- | | | | |
|---|---|---------|-----------------------|
| 1 | Concrete cooling water Tank with pipe work & small overhead after-run Tank. | ... RS. | 4,500 |
| | | RS. | 48,400 ^{RS.} |
| | 1-90/100 & 1-45/50 K. 7500 & 750 R.P.M. | | 48,400 |
| | 400/440 Volts. 3 Phase: | | |
| | 50 Cycles, 4 Wires. | | |

Diesel Engine alternator sets including standard accessories and spares @ RS. ____.

...	RS.	83,730
-----	-----	--------

- | | | | |
|---|---|---------|-------|
| 2 | Circulating water motor pumping sets. | RS. | 3,000 |
| 1 | Compressed air starting equipment and receiver. | ... RS. | 4,370 |

- | | | | |
|---|------------------------------|-----|--|
| 1 | Transformer and switchgear { | RS. | |
| 1 | " " " } | RS. | |

- | | | | |
|----|--|---------|-------|
| 1 | Open flat back type ~~sheet metal~~ Sindanyo panel switchboard comprising | | |
| | <u>Two</u> alternator control panels | | |
| 2- | <u>Two</u> circuit feeder panels and | | |
| | <u>One</u> street lighting and lower House lighting panel and Synchronising bracket. | ... RS. | 8,500 |

- | | | | |
|---|--|---------|-------|
| 1 | Set Interconnecting cables between Generators and Switchboard and between switchboard and terminal pole structure outside the Power House. | ... RS. | 1,200 |
|---|--|---------|-------|

Approximate cost of Erection and supervision.

...	RS.	7,500
-----	-----	-------

Miscellaneous such as Fitters and small workshop tools.

...	RS.	5,000
RS.	1,13,300	Rs. 1,13,300

Grand Total ... RS. 1,61,700

Sirsi (M.P.S.)

<u>Transmission and Distribution.</u>		Ruppes
Miles combined Transmission and Distribution using wooden poles @ Rs.	per mile.	
Miles Transmission using wooden poles @ Rs.	per mile.	
9 Miles Distribution using wooden poles @ Rs.	8,000 per mile.	72,000
4-75 K.V.A. Stepdown Transformer.		
4-50 K.V.A.	" "	
Nos. 11 K.V. Lightning Arrestors @ Rs.	each.	
Nos. 11 K.V. T.F. Gang operated air break switch & fuses		
No. 11 K.V. T.F. hook operated isolators and fuses @ Rs.	.	
Nos. Substation Structures @Rs.		
Sets. L.T. Switchgear for the control of Transformers & outgoing distributors @ Rs.		
200 Nos. of St. lights and fittings @ Rs. 20		4,000
10 Sets. L.T. Lightning Arrestors @ Rs.. 100	each set.	1,000
800 Nos. Service connections @ Rs. 20		16,000
100 Bazar services @ Rs. 40.		4,000
800 H.S. Meters @ Rs. 38.		30,400
4 Energy Meters for P.S. @ Rs. 100.		400
4 Power Services @ Rs. 150.		600
2 Lineman's Tool boxes @ Rs. 2000.		4,000
Testing Apparatus		2,000
Erection of Sub-Station.		
RS.....		1,34,400

Abstract:

Power House equipped with necessary machinery, Building etc.	Rs. 1,61,700.
Transmission & Distribution.	Rs. 1,34,400.
Contingencies.	Rs. 5,900.

Total Capital Rs. 3,02,000

SIRSI (M.P.S.)

Depreciation & Interest.

Capital Amount: Amount of: ARCC: 100
 : Depre. 1/100
 : Sinking 1/100
 : Fund Method: 1/100
 RS. : 100

Power House.

Power House Building, Fuel &
 Storage and water cooling
 tanks including pumping sets
 etc. (~~xxxxxx~~ S.F.O.03722)

68,350

2,543

1-90/100 } K.W. Diesel Engine
 1-45/50 } generating sets 400/
 440 Volts, 3 phase, 50 cycles
 with starting equipment etc.
 (~~xxxxxx~~ S.F.O.05377)

93,350

5,019

Transmission & Distribution

Transmission & Distribution
 (~~xxxxxx~~ S.F.O.03722)

72,000

2,679

Meters for House Services
 and power.

(~~xxxxxx~~ S.F.O.05377)

30,800

1,656

Services, toolboxes, testing apparatus
 transformers, switchgear etc.

(~~xxxxxx~~ S.F.O.03722)

31,600

1,176

13,073

Interest on Capital RS. 3,02,00
 @ 3 1/2% per annum.

RS. 10,570

M Depreciation & Interest.

RS. 23,643

=====

Units Generated.

Probable Sale of Units in Case of
 Non Industrial load:-

78,871 Units.

Probable Sale of Units in case of
 Industrial load:-

65,850 "

Units required for cooling water
 Motor pumping set. :-

8,760 "

Total:.....

1,53,481

Plus loss due to Transmission and
 Distribution say ~~xxxx~~ 10%

15,340

Total generation will be ...
 say

1,68,829 Units.

=====

1,69,000 Units.

Cost of Fuel.

Fuel consumption per unit generated = $\frac{0.43}{746 \times .89} = 0.65 + 33 \frac{1}{3} \% = 0.86$ lbs

Cost of Fuel Oil per unit generated $\frac{0.86 \times 1440}{2240} = 0.55$ anna.
 Fuel Oil @ Rs. 90 per Ton. =

Total quantity of Fuel oil required for the year. = $\frac{0.86 \times 169000}{2240} = 65$ tons.

Working cost under this heading. = $65 \times 90 = \text{Rs. } 5,850.$

SIRSI (" P. S.)

List of Operating Staff:Power House:

1. Electrical and Mechanical Foreman.	Rs.100 p.m.
3 Engine Attendants.	Rs.120 "
3 Switchboard attendants.	Rs.120 "
~~3 Coolies~~	~~Rs. 75 "~~
<u>Distribution.</u>	Rs.415/- i.e. Rs.4980 P.A.
1 Line Foreman.	Rs.100 p.m.
2 Lineman.	Rs. 80 "
2 Coolies.	Rs. 50 "
1 Meterman.	Rs. 40 "
	Rs.270 i.e. Rs.3240 P.A.

Office Staff.

1 Assistant Accountant Cashier and Head Clerk.	Rs.100 p.m.
2. Clerks.	Rs. 80 "
1 Chaprasi.	Rs. 20 "
	Rs.200 "
	i.e. Rs.2400 P.A.

Cost of Lubricating Oil.

Consumption 600 gallons.

Cost per unit generated @ Rs. 3 per gallon. = $\frac{600 \times 48}{169000} = 0.17$.Working cost under this heading = $600 \times 3 = \text{Rs. } 1800$.Cost of Operating & Supervision.(Including that of ~~Transxxx~~ Distri.)

Power House Staff - Rs. 4,980

~~Transmission~~ & Distribution - Rs. 3,240

Office Staff. - Rs. 2,400

Head Office Supervision and Rs. 250

Management say .. - Rs. 250

To cover up the travelling charges
of the Engineer at Kunta
Total..Rs.. Rs. 11,120 per annum.Cost per unit generated will be = $\frac{11120 \times 16}{169000} = 1.05 \text{ anna}$.Water and Stores.

Cost per unit say - 0.10 anna

Working cost under this heading = $\frac{0.10 \times 169000}{16} = \text{Rs. } 1056$ Repairs & Maintenance.

Cost per unit say - 0.12 anna

Working cost under this heading = $\frac{0.12 \times 169000}{16} = \text{Rs. } 1267$ Incidentals & Insurance.

Cost per unit - 0.10 anna

Working cost under this heading = $\frac{0.10 \times 169000}{16} = \text{Rs. } 1056$ Running Cost.

	Working cost in: Rs.	Cost in annas per unit generated.
Fuel Oil.	5850	0.55
Lubricating Oil.	1800	0.17
Operation and Supervision..	11120	1.05
Water and Stores.	1056	0.10
Repairs and Maintenance.	1267	0.12
Incidentals and Insurance.	1056	0.10
Total Working Cost..	Rs. 22149	2.09

Fixed Charges.

Interest on capital of Rs. 3,02,000 @ $3\frac{1}{2}\%$ P.A. is
Rs. 10,570
Depreciation by sinking fund method will be Rs. ... 13,073
Total Depre, and Interest. Rs. 23,643

Fixed charge per unit generated will be = $\frac{23643 \times 16}{169000} = 2.24 \text{ annas}$.

i.e. Total Distributing cost per unit = $2.09 + 2.24 = 4.33 \text{ annas}$

Sirsi (M.P.S.)

Annual Revenue.

200 Municipal St. lights @ Rs.36 /- P.A.each.- Rs. 7,200

100 Bazar lights @ Rs30 /- per lamp P.A. - Rs. 3,000

General domestic lights @ as. per unit.)
 (~~5640~~ 56402 units).) - Rs.

Government offices & Buildings etc. @as.)
 per unit (units.)) - Rs. 21,150

Annual meter Rentals@ Rs.6/- P.A.(800) - Rs. 4,800

Cinema - @ 1½ as. per unit (4455) - Rs. 347

Motive Power -

@ 1½ as. per unit - ~~50~~ 50850 units. - Rs. 3,972
 @ 1 as. " " - 15000 " - Rs. 937

Fixed charge @ Rs.21/- P.A. per H.P.(50 H.P.)Rs. 1,050

Total Revenue ... Rs. 42,456

Total Revenue - Rs. 42,456

Less Working Cost. - Rs. 22,149

Balance..... Rs. 20,307

Less Depre. & Interest.Rs. 23,643

Nett ~~Profit~~/Loss in the)
 year of working.)Rs. 3,336

<u>Transmission and Distribution.</u>		<u>Rupees</u>
2	- Miles combined Transmission and Distribution using wooden poles @ Rs. 10,000 per mile.	25,000
	Miles Transmission using wooden poles @ Rs. 2 per mile.	
3½	- Miles Distribution using wooden poles @ Rs. 7000 per mile.	24,500
	1-75 K.V.A. Stepdown Transformer.	3,500
	2-50 K.V.A. " "	5,100
12	- Nos. 11 K.V. Lightning Arrestors @ Rs. 250 each.	3,000
4	- Nos. 11 K.V. T.P. Gang operated air break switch & fuses @ Rs. 1000	4,000
2	- Nos. 11 K.V. T.P. hook operated isolators and fuses @ Rs. 300.	600
8	- Nos. Substation Structures @ Rs. 600.	1,800
3	- Sets. L.T. Switchgear for the control of Transformers & outgoing distributors @ Rs. 1700	5,100
130	- Nos. of St. lights and fittings @ Rs. 20	2,600
12	- Sets. L.T. Lightning Arrestors @ Rs. 100 each set.	1,200
700	- Nos. Service connections @ Rs. 20.	14,000
150	- Bazar services @ Rs. 40.	6,000
700	- H.S. Meters @ Rs. 36	26,600
5	- Energy Meters for P.S. @ Rs. 100.	500
5	- Power Services @ Rs. 150	750
2	- Lineman's Tool boxes @ Rs.	4,000
	Testing Apparatus	5,000
	Erection of Sub-Station.	1,500
Rs.		<u>1,34,750</u>

Abstract:

Power House equipped with necessary machinery, Building etc.	Rs. 1,69,890
Transmission & Distribution	Rs. 1,34,750
Contingencies.	Rs. 5,360

Total Capital, Rs. 3,10,000

Depreciation & Interest.

Capital Amount: Amount of: ~~Allowance~~ Dr.
 : Depre. by: ~~Depreciation~~
 : Sinking : ~~Rate~~
 : Fund Method: ~~Method~~
 Rs. : Rs.

Power House.

Power House Building, Fuel & Storage and water cooling tanks including pumping sets etc. (~~St. Line~~ 5% S.F.O.03722) 76,540 2,848

1-90/100 } K.W. Diesel Engine
 1-45/50 } generating sets 400/440 Volts, 3 phase, 50 cycles with starting equipment etc. (~~St. Line~~ 5% S.F.O.05377) 93,350 5,019

Transmission & Distribution

Transmission & Distribution (~~St. Line~~ 5% S.F.O.03722) 49,500 1,842

Meters for House Services and Power. (~~St. Line~~ 5% S.F.O.05377) 27,100 1,457

Transformers, switchgears etc. (~~St. Line~~ 5% S.F. O.03722) 58,150 2,164

13,330

Interest on Capital Rs.3,10,000 @ 3 1/2% per annum. ... Rs. 10,850

M Depreciation & Interest. ... Rs. 24,180
 =====

Units Generated.

Probable Sale of Units in Case of Non Industrial load:- 1,01,887 Units.

Probable Sale of Units in case of Industrial load:- 1,44,070 "

Units required for cooling water Motor pumping set. :- 8,760 "

Total..... 2,54,717

Plus loss due to Transmission and Distribution say about 15 % 37,283

Total generation will be ... 2,92,000 Units.
 =====

Cost of Fuel.

Fuel consumption per unit generated = $\frac{0.43}{0.746 \times 0.89} = 0.65 + 33 \frac{1}{3} \% = 0.86$

Cost of Fuel Oil per unit generated Fuel Oil @ Rs. per Ton. = $\frac{0.86 \times 1440}{2240} = 0.55$ anna.

Total quantity of Fuel oil required for the year. = $\frac{0.86 \times 292000}{2240} = 112$ tons.

Working cost under this heading. = 90 x 112 = 10,080 Rs.

List of Operating Staff:-Power House:-

1 Assistant Engineer	Rs.150 p.m.
2 Elect. & Mech. Foreman	Rs.100 "
3 Engine Attendants.	Rs.120 "
3 Switch board attendants.	Rs.120 "
3 Coolies.	Rs. 75 "

Transmission & Distribution..

1 Line Foreman	Rs.100 P.m.	Rs.565 i.e. Rs.6780 P.A.
2 Linemen.	Rs. 80 "	
2 Coolies.	Rs. 50 "	
1 Meterman.	Rs. 40 "	
	Rs.270 i.e. Rs.3240 P.A.	

Office Staff:

1 Assistant Accountant, Cashier and Head Clerk.	Rs.100 p.m.	
2 Clerks.	Rs. 80 "	
1 Chaprasi.	Rs. 20 "	
	Rs.200 " i.e. Rs.2400 P..	

Cost of Lubricating Oil.

Consumption 1000 gallons/yr.

Cost per unit generated @ Rs. 3/-per gallon. = $\frac{1000 \times 48}{292000} = 0.16$ anna.

Working cost under this heading = $1000 \times 3 = \text{Rs. } 3000$.

Cost of Operating & Supervision.

(Including that of Trans. to Distri.)

Power House Staff - Rs. 6,780.

Transmission & Distribution - Rs. 3,240.

Office Staff. - Rs. 2,400.

Head Office Supervision and 500

Management say Rs. 5,000

Total..Rs.. Rs. 12,920 per annum.

Cost per unit generated will be = $\frac{12920 \times 16}{292000} = 0.71$ anna

Water and Stores.

Cost per unit say - 0.08

Working cost under this heading = $\frac{0.08 \times 292000}{16} = \text{Rs. } 1,460$.

Repairs & Maintenance.

Cost per unit say - 0.10

Working cost under this heading = $\frac{0.10 \times 292000}{16} = \text{Rs. } 1,825$

Incidentals & Insurance.

Cost per unit - 0.07

Working cost under this heading = $\frac{0.07 \times 292000}{16} = \text{Rs. } 1,277$

Running Cost.

	Working cost in: Cost in annas per
	Rs. : unit generated.
Fuel Oil,	10,080 0.55
Lubricating Oil.	3,000 0.16
Operation and Supervision.	12,920 0.71
Water and Stores.	1,460 0.08
Repairs and Maintenance.	1,825 0.10
Incidentals and Insurance.	1,277 0.07
Total Working Cost...	Rs. 30,562 1.67

Fixed Charges.

Interest on capital of Rs. 3,10,000 @ $3\frac{1}{2}\%$ P.A. is Rs. 10,850

Depreciation by sinking fund method will be Rs. 13,330

Total Depre. and Interest. Rs. 24,180

Fixed charge per unit generated will be = $\frac{24180 \times 16}{292000} = 1.32$ anna

i.e. Total Distributing cost per unit = $1.67 + 1.32 = 2.99$ annas

Annual Revenue.

130 ~~800~~ Municipal St. lights @ Rs. 36/- P.A. each. - Rs. 4,680.

150 ~~100~~ Bazar lights @ Rs. 30/- per lamp P.A. - Rs. 4,500.

General domestic lights @ as. per unit.	}	- Rs.
(~~5640~~ 76,365 units).		
including		
Government offices & Buildings etc. @as.	}	- Rs. 28,636.
per unit (units.)		

Annual meter Rentals @ Rs. 6/- P.A. (700) - Rs. 4,200.

Cinema - @ 1½ as. per unit (10,950) - Rs. 855.

Motive Power -

@ 1½ as. per unit - ~~52~~ 1,05,620 units.	- Rs. 8,251
@ 1 as. " " - 38,450	- Rs. 2,403

Fixed charge @ Rs. 21/- P.A. per H.P. (106 H.P.) - Rs. 2,226

Total Revenue ... Rs. 55,751

Total Revenue Rs. 55,751.

Less Working Cost. - Rs. 30,562

Balance.... Rs. 25,189

Less Depre. & Interest. Rs. 24,180

Nett Profit/Loss in the
year of working.) Rs. + 1,009.

Electric Grid Offices

With regard to the remarks of the Electrical Engineer to Government in para.2(1) of his note, the sizes of sets proposed have been so fixed that the percentage capacity of stand-by plant may be kept down to the minimum thus reducing the initial cost of the Scheme, at the same time maximum economy in running the plant may be obtained. There will be an intervening period of at least a few years before the peak load will exceed the limiting capacity of the small size set in any of the stations proposed, and after some four or five nursery stations are established in the district and the load conditions are studied, the question of maintaining one mobile set of adequate capacity to serve as spare for the stations in the district, will be considered and it is hoped this will meet an emergency occasioned by the stoppage of a large set in any of the stations proposed.

2. Approximate figures given for units sold in the case of Karwar, Kumta, Sirsi and Bhatkal schemes cannot be very well compared with the actual figures obtained in the case of Dharwar Electric Supply Co.Ltd., for the simple reason that when the price of diesel oil was as low as Rs.45 per ton during pre-war period, the said Company, just as is usual with most of the supply concerns in the Province, used to maintain high tariff rates, especially those for the sale of motive power ranging from annas 2 to annas 3 per unit. This has evidently hampered the growth of supply companies' load, whereas in the case of

schemes under consideration, the rates for the sale of motive power have been taken as low as 1 to 1½ anna per unit, and it is considered that the proposed tariff rates will assist considerably in securing most of the motive power load available although this will entail some loss in the beginning in running the stations. Further, the figures given below will indicate that the consumption of electricity in a particular place depends not so much on the population, as it does on the industries which are required to be electrically served in that place.

/ Besides, the Grid authority is expected to stimulate use of electricity by giving on hire purchase, electrically operated industrial appliances, and pumps etc and generally to carry out a vigorous sales policy.

Name of Supply Co.	Population	Total units sold in 1935-36	Electricity Consumption per head of population	Total Units sold in 1939-40.	Electricity consumption per head of population.
Malegaon Electric Supply Co.	32,462	23,910	1.4	5,39,779	22.3
Jalgaon Electric Supply Co.	34,375	2,82,246	8.2	9,53,421	27.7
Belgaum Electric Supply Co.	41,204	4,44,308	10.8	9,25,649	22.5
Nasik Electric Supply Co.	48,703	13,53,586	27.6	16,60,950	
Nadiad Electric Supply Co.	34,584	3,11,465	9.0	4,72,132	13.7

It is suggested, therefore, that the figures as submitted, which are based on the actual survey details obtained at site, may be taken as correct.

3. Regarding para.2(2) of the Electrical Engineer's note, the working cost is made up of the ~~fixe~~ following:-

1. Cost of fuel.
2. Cost of lubricating oil.

- 3. Cost of operation and supervision.
- 4. Cost of water & stores.
- 5. Cost of repairs and maintenance.
- 6. Incidentals and Insurance.

4. Copies of the make up sheets relating to the above for each scheme, are enclosed herewith. In the absence of any details relating to the make up of the working cost in the case of Dharwar Electric Supply Co., Ltd., it is not possible to make any comparison with the figures submitted.

W.B.A.
21/1/46.

To
The Secy. to Govt.,
P.W.D., Bombay.
U.O.R. No. Elg. ¹⁷⁸ ~~18~~ 1302
Bombay, 21st Jany. 1946.

981
A.R.

(P.R. (1))
22/1/46

The U. Engr. B. Govt. may please see very
urgently w.r. to his U.O.R. of 29th Nov. 1945.
Wh 25-30

21
22.1.46.

P. W. D.
File No. 7605/36
Serial No. 2807

1
v. urgent.

u.o. to the U. Engr. to Govt, 22-1-46

SCHEDULE "A".

Place.	Year ending.	Public lamps.	Special contracts.	Lighting.	Power.	Total.	Remarks.
		Units.	Units.	Units.	Units.	Units.	
1. Malegaon.	31-3-1936.	3,080	--	14,328	6,402	23,810.	Heavy power load due to large influx of hand loom weavers from Barahanpur.
	31-3-1940.	21,773	19,166	84,030	539,779	664,748.	
2. Jalgaon.	31-3-1936	60,972	277	83,519	137,478	282,246.	Special contract for power for Municipal pumping.
	31-3-1940	47,211.5	691,475	84,430	130,304	953,421.	
3. Belgaum.	31-3-1936	43,033	80,880	127,799	192,546	444,308.	Military Station
	31-3-1940	53,375	272,830	182,746	416,198	925,649.	
4. Nadiad.	31-3-1936	17,585	129,600	43,657	120,623	311,465.	Military Station, Security Press, Jail and Govt. Distillery.
	31-3-1940	34,680	--	98,368	339,083	472,132.	
5. Nasik.	31-12-1936	85,955	828,015	228,015	211,601	1,353,586.	
	31-12-1940	36,835	894,832	387,137	342,146	1,660,950.	
6. Dharwar.	31-12-1936	67,473	--	63,285	94,064	224,822.	
	31-12-1940	44,882	32,299	90,670	113,757	281,609.	

SCHEDULE "A".

Place.	Year ending.	Public lamps.	Special contracts.	Lighting.	Power.	Total.	Remarks.
		Units.	Units.	Units.	Units.	Units.	
1. Malegaon.	31-3-1936.	3,080	--	14,328	6,402	23,810.	Heavy power load due to large influx of hand loom weavers from Burhanpur.
	31-3-1940.	21,773	19,166	84,030	539,779	664,748.	
2. Jalgaon.	31-3-1936	60,972	277	83,519	137,478	282,246.	Special contract for power for Municipal pumping.
	31-3-1940	47,211.5	691,475	84,430	130,304	953,421.	
3. Belgaum.	31-3-1936	43,083	80,880	127,799	192,546	444,308.	Military Station
	31-3-1940	53,875	272,830	182,746	416,198	925,649.	
4. Nadiad.	31-3-1936	17,585	129,600	43,657	120,623	311,465.	Military Station, Security Press, Jail and Govt. Distillery.
	31-3-1940	34,680	--	98,368	339,083	472,132.	
5. Nasik.	31-12-1936	85,955	828,015	228,015	211,601	1,353,586.	
	31-12-1940	36,835	894,832	387,137	342,146	1,660,950.	
6. Dharwar.	31-12-1936	67,473	--	63,285	94,064	224,822.	
	31-12-1940	44,882	32,299	90,670	113,757	281,609.	

159

SCHEDULE "B".

Place.	Total population in the area of supply. 1941	Year of working.	Units for lighting.	Units per head of population.	Rate charged.	Remarks.
1. Malegaon.	40,922.	1st. 5th.	14,328 84,030	0.35 2.06	I I	6 As.per unit.
2. Jalgaon.	48,596.	5th. 9th.	83,519 84,430	1.73 1.75	I I	6 As.per unit.
3. Belgaum.	75,482.	3rd. 7th.	127,799 182,746	1.70 2.45	I I	5½ annas per unit.
4. Nadiad.	46,510.	4th. 8th.	43,657 98,363	0.94 2.10	I I	5½ As.per unit.
5. Nasik-Deolali.	71,816	6th. 10th.	223,015 387,137	3.18 5.40 *	I I	5½ As.per unit for (*) Military Camp the 1st 3 units. lighting at 4½ " next 40 units. Deolali. 3½ " for the rest.
6. Dharwar.	47,992	6th. 10th.	63,285 90,670	1.32 1.90	I I	6 As.per unit.
Karwar.	20,662	5th. 10th.	127,411 191,116	6.13 9.20	I I	6 As.per unit.
Gokarn.	10,082	5th 10th	44,998 67,497	4.45 6.75	I I	6 As.per unit.
Kumta.	21,405	5th 10th	142,554 213,831	6.70 10.00	I I	6 As.per unit.
Sirsi.	10,451	5th. 10th.	78,871 118,306	7.50 11.00	I I	6 As.per unit.
Bhatkal.	10,718	5th 10th.	101,387 152,830	9.40 14.20		6 As.per unit.

SCHEDULE "B".

Place.	Total population in the area of supply. 1941	Year of working.	Units for lighting.	Units per head of population.	Rate charged.	Remarks.
1. Malegaon.	40,922.	1st. 5th.	14,388 84,030	0.35 2.06	6 As. per unit	
2. Jalgaon.	48,596.	5th. 9th.	83,519 84,430	1.73 1.75	6 As. per unit.	
3. Belgaum.	75,482.	3rd. 7th.	127,799 182,746	1.70 2.45	5½ annas per unit.	
4. Nadiad.	46,510.	4th. 8th.	43,657 98,368	0.94 2.10	5½ As. per unit.	
5. Nasik-Deolali.	71,816	6th. 10th.	228,015 387,137	3.18 5.40 *	5½ As. per unit for the 1st 3 units. 4½ " next 40 units. 3½ " for the rest.	(*) Military Ca lighting at Deolali.
6. Dharwar.	47,992	6th. 10th.	63,285 90,679	1.32 1.90	6 As. per unit.	
Karwar.	20,662	5th. 10th.	127,411 191,116	6.13 9.20	6 As. per unit.	
Gokarn.	10,082	5th 10th	44,998 67,497	4.45 6.75	6 As. per unit.	
Kamta.	21,405	5th 10th	142,554 213,831	6.70 10.00	6 As. per unit.	
Sirsi.	10,451	5th. 10th.	78,871 118,506	7.50 11.00	6 As. per unit.	
Bhatkal.	10,718	5th 10th	101,887 152,830	9.40 14.20	6 As. per unit.	

SCHEDULE "C".

Place.	Total population.	No. of consumers.	Yrs. of working	Consumers per 100 of population.	Cost of public lighting. Rs.	Cost of public lighting per head of population. Rs.	Meter Rent. Rs.
1. Malegaon.	40,992.	1099	5th	2.7	5,443	0.133	2,838.
2. Jalgaon.	48,596.	1115	9th	2.3	9,397	0.193	2,655.
3. Nasik-Deolali.	78,816.	3095	10th	4.2	9,590	0.131	6,978.
4. Nadiad.	46,510	851	8th	1.83	7,225	0.154	3,054.
5. Belgaum.	75,482	1987	7th	2.65	12,802	0.170	10,884. (*)
6. Dharwar.	47,992	912	11th	1.91	12,074	0.250	3,198
Karwar.	20,662	1175	} 5year of working	5.7	10,380	0.51	7,050.
Gokarn.	10,082	500		5.0	3,840	0.384	3,000.
Kumta.	21,405	1600		7.5	24,090	1.12	9,600.
Sirsi.	10,451	800		7.6	10,200	0.97	4,800.
Bhatkal.	10,718	700		6.5	9,180	0.86	4,200.

(*) includes rental on Refrigerators, motors etc. given to consumers on hire by the Company.

SCHEDULE

Place.	Total population.	No. of consumers.	Yrs. of working	Consumers per 100 of population.	Cost of public lighting.	Cost of public lighting per head of population.	Meter Rent.
					Rs.	Rs.	Rs.
1. Malgaon.	40,892.	1099	5th	2.7	5,443	0.133	2,838.
2. Jalgaon.	48,596.	1115	9th	2.3	9,397	0.193	2,655.
3. Nasik-Deolali.	78,816.	3095	10th	4.2	9,590	0.131	6,978.
4. Nadiad.	46,510	851	8th	1.83	7,225	0.154	3,054.
5. Belgaum.	75,482	1987	7th	2.65	12,802	0.170	10,884. (*)
6. Dharwar.	47,992	912	11th	1.91	12,074	0.250	3,198
Karwar.	20,662	1175		5.7	10,380	0.51	7,050.
Gekarn.	10,082	500		5.0	3,840	0.384	3,000.
Kunta.	21,405	1600	5 year of working	7.5	24,090	1.12	9,600.
Sirsi.	10,451	800		7.6	10,200	0.97	4,800.
Bhatkal.	10,718	700		6.5	9,180	0.86	4,200.

(*) includes rental on Refrigerators, meters etc. given to consumers on hire by the Company.

.109
Below U.O.R.No.7605/36-2807 dated the
22nd Janry.1946 from Government in the
Public Works Department.

No. 22231 4510 of 1946.

P.W.D. Offices, Churchgate St.
Port, Bombay 1. d/25-9 Janry.1946.

Returned with compliments.

2. With reference to the S.O.Grid's proposal to consider the provision of a mobile set of adequate capacity to serve as a spare in order to meet the emergency occasioned by the stoppage of a large set in any of the stations proposed, according to the load figures of the stations in question (pages 5 to 13 of the file) the stations at Karwar, Kumta, Sirsi and Bhatkal will be liable to interrupted supply within 2 to 4 years from their commencement of working. It is, therefore, advisable to make provision for the stand-by set in question in the Scheme itself. I personally consider that if the estimated loads in question are at all liable to be realised it will be a better proposition to order larger sets for Karwar, Kumta and Bhatkal from the commencement so that either of the two sets provided at each station will be capable of taking the estimated maximum load in the 5th year of working; on the other hand, if the load at the end of the 5th year of working does not exceed the capacity of the smaller set at each station, the sets already provided should be adequate and the question of providing the spare mobile set can be considered later on if and when the load develops. This I consider would be a better proposition as I am very doubtful that the anticipated loads given by the S.O.Grid will be realised in practice.

3. With reference to the figures given by the S.O.Grid in his letter of the 21st Janry.1946, it is not known from where these have been taken as they are much lower than those given in the 1940-41 Census Report. Please see Schedule "B" attached.

4. The undersigned agrees with the S.O. Grid that the consumption of electricity in a particular place depends not so much on the population, as it does on the Industries which can be served. The S.O. Grid states that the proposed rates for the sale of motive power have been taken by him as low as 1 to 1½ annas per unit. According to the working cost submitted with his letter under reference as the Distributing cost per unit is considerably above the proposed sale rates for motive power, it will be necessary to make-up the loss on revenue from lighting.

P.T.O.

Distributing Cost

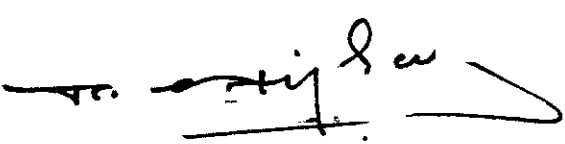
Karwar	4.14 As. per unit.
Gokarn	5.01 As. per unit.
Kumta	3.83 As. per unit.
Sirsi	4.33 As. per unit.
Bhatkal	2.99 As. per unit.

5. In this connection, Schedule "B" *p 101* attached shows the units for lighting in the various years of working at the towns mentioned by the S.O. Grid compared with his estimated lighting units for towns in the Scheme. It will be seen that the estimated figures for lighting units are exceptionally optimistic as compared with those which have actually materialised in the case ~~of~~ of companies already working in the Province. The revenue earning portion of the present Scheme will have to depend entirely on lighting units if the power rates are under the Distribution Cost per unit and if the lighting units as calculated by the S.O. Grid are modified on the basis of the towns actually working, the financial forecast of the Scheme will be materially affected.

6. As regards the number of consumers to be connected to the Supply and the revenue expected to be realised from public lighting, these also appear to have been very optimistically estimated. This will be seen from Schedule "C" *p 105* prepared to compare the number of consumers at different places already working and also the cost of lighting per head of population, as shown by the companies' working in the year 1939-40. The figures from the S.O.'s forecast for the 5th year of working have also been shown for comparison.

7. As regards the cost of operating and supervision given by the S.O. in his financial forecast for the 5th year of working, it is observed that the figures for staff salaries have been based on the pre-war rates and do not allow for D.A. granted to employees in general at present. Actually most of the supply companies in the Province are experiencing difficulty to obtain suitable persons even at 50% increased salaries than those allowed by the S.O. Grid.

8. With reference to para 4 of S.O.'s letter, it is understood that the accounts of the Dharwar Elec. Supply Co. for the year under reference have already been forwarded to the S.O. Grid for his perusal.


Electrical Engineer to Govt.

I.
File no. 7605/36
Serial No. 3381-A

Attention is invited to the Electrical Engineer to Government's remarks in para.2(1) of his note at page 29. The objection does not seem to have been satisfactorily explained by the S.O. (vide the S.O.'s reply at p.93). The S.O. states that "there will be an intervening period of at least a few years before the peak load will exceed the limiting capacity of the small size set in any one of the stations proposed" A reference to the statements at pp.5-13 shows that the limiting capacities will actually be exceeded within two to four years.. The idea of having a mobile set to serve as a stand by to five stations is novel to me, but it seems to be very doubtful how far it will serve the purpose when the distance between these places is considered. If the set is at Karwar and a breakdown occurs at Bhatkal in the monsoon it will be quite a few days before the set could be transported. I therefore agree with the suggestion of the Electrical Engineer to Government in para 2 of his note at page 109. If the suggestion is adopted the cost of the schemes will naturally increase.

2. The Electrical Engineer to Government has raised a very pertinent point in paras.4 and 5 of his note ^{p.109-110} and I agree with his conclusions.

3. I also agree with paras. 6 and 7 of the Electrical Engineer to Government's note. p 110

4. It is not clear whether the cost of supplying electrical energy and power to these places from the Mysore Jog Falls Hydro Electric Station has been worked out. The Mysore Government have agreed to the supply of electric power up to a maximum of 5,000 E.H.P. to the Government of Bombay on reasonable terms to be mutually agreed upon. The Mysore Government had offered to supply energy at the rate of 0.25 anna per K.W.H. We had requested them to reduce the rate to 0.125 anna per K.W.H. but the Mysore Government had declined to reconsider the matter. As there was no immediate demand for electricity in this Province the question was not pursued any further.

5. Even at 0.25 anna per K.W.H. it may be worth while considering buying energy from Mysore and transmitting it to various stations in Kanara District. Sirsi, Honavar, Bhatkal and Kumta and Gokarn are practically within fifty miles of the Hydro Electric Station. Karwar is about 80 miles along a straight line. Siddapur is quite close to the Hydro Electric Stations and could be included in the scheme. I suggest that this alternative may be examined before taking a final decision.

GU
26.1.46

secy (F)

BVF

F. D.

A(R)

I am at a loss to know how to deal with these Grid Schemes; if they are to be treated along the usual lines, it seems that none of them are likely to prove acceptable, costs are high, rates are questionable, anticipated loads are super-optimistic, and returns extremely doubtful or negative.

2. If however it is Govt. policy to supply electricity as widely as possible in the Province, as quickly as possible, and without worrying too much over the cost or the anticipated return; then a very different line can be taken. This latter seems to be the policy.

3. I am inclined to agree with the Electrical Engineer to Govt.'s view regarding stand by plant, as summarised by the Deputy Secretary in para.1 of his note page 111, but this is a matter for electrical experts to decide and if the S.O.(Grid) is satisfied with the proposals put up, this Department must accept them, since he will be responsible in the case of failure.

4. The question of rates is one entirely of Policy and whilst I personally consider the forecasts of load and return optimistic; that remains the responsibility of the S.O.(Grid) who has his experts to work such things out.

5. Presumably the S.O.(Grid) has considered the possibility of obtaining the supply from the Mysore Jog Falls Station; if not, this may be done before the scheme is put into operation.

6. The scheme is in accordance with Government's proposals for Post War Planning and if the financial side is satisfactory, there would seem no other objection to

M.H.
20/1/46.

A(R)

Letter

No.Elg.118/3255
Office of the Special Officer(Electric G
Old Custom House Yard, Fort,
Bombay, 4th October, 1945.

To

The Secretary to Government,
Public Works Department,
Bombay.

Subject:- Nursery Electrification Scheme for
Kanara District.

Adviser (R. & P.W.D.) desired during the course of a personal discussion sometime back, that I should submit to Government, a Nursery Electrification Scheme for certain important townships in the Kanara District. I accordingly forward herewith a detailed note on the Scheme and recommend that Government may be pleased to sanction the proposals. In the event of the Scheme being sanctioned, I request that in the Government Resolution which may issue, I may be authorised to place orders for power house plant and carry through the Scheme under the procedure which Government have decided to lay down in connection with the execution of the Nursery Electrification Schemes in the Ratnagiri District and electrification of certain villages in the Bulsar and Satara Talukas.

Sd/- P.B.Advani.

Special Officer(Electric Grid)

Encl.- 1 Note with
Accompts.

P.T.O.

ARK.

No. Elg. 118/3256
Bombay, 5th October, 1945

An advance copy forwarded with compliments for information
to Sir Godfrey Collins, K.C.I.E., C.S.I., O.B.E., I.C.S., Adviser (R&P.W.D.)
Council Hall, Poona.

P. B. Advani,
Special Officer (Electric Grid).

*This can await submission of
the case by P.W.D.*

7/10/45 f

ENCLOSURE.

SCHEDULE "B" (REVISED)

S.No.	Place.	Total population in the area of supply.	Year of working.	Units for lighting.	Units per head of population.
1.	Malegaon.	32,462.	1st 5th	14,328 84,530	0.44 2.62
2.	Jalgaon.	34,375	5th 9th	83,519 84,530	2.43 2.45
3.	Belgaum.	41,204	3rd 7th	1,27,709 1,82,749	3.10 4.43
4.	Nadiad	54,584	4th 8th	43,657 98,368	1.26. 2.84.
5.	Nasik Deolali.	48,703 7,805	6th 10th	2,28,015 3,87,137	4.04 6.50
6.	Dharwad.	41,371	5th 10th	63,235 90,670	1.52 2.18
7.	Yarwer.	20,562	1st	13,465	0.65
			3rd	50,493	2.44
			5th	67,325	3.25
			7th	80,790	3.90
			10th	1,00,987	4.88
8.	Golbarn.	10,022	1st	5,936	0.59
			3rd	22,260	2.21
			5th	29,680	2.94
			7th	35,616	3.54
			10th	44,520	4.41
9.	Kumbha-Honavar.		1st	16,704	0.78
			3rd	62,690	1.33
			5th	82,520	2.90
			7th	1,00,224	4.63
			10th	1,25,280	5.35

SCHEDULE "B" (REVISED)

ENCLOSURE.

No.	Place.	Total population in the ares of supply.	Year of working.	Units for fighting.	Units per head of population.
1.	Malegaon.	32,462.	1st 5th	14,328 84,030	0.44 2.62
2.	Jalgaon.	34,375	5th 9th	83,519 84,530	2.43 2.45
3.	Belgaum.	41,204	3rd 7th	1,27,799 1,82,749	3.10 4.43
4.	Nadiad	54,584	4th 8th	43,657 98,368	1.26 2.84
5.	Nasik Deolali.	48,703 7,805	6th 10th	2,28,015 3,87,137	4.04 6.50
6.	Dharwar.	41,671	6th 10th	63,285 90,670	1.52 2.18
1	Karwar.	20,662	1st 3rd 5th 7th 10th	13,465 50,493 67,325 80,790 1,00,987	0.65 2.44 3.25 3.90 4.88
2.	Goharn.	10,082	1st 3rd 5th 7th 10th	5,936 22,260 29,680 35,616 44,520	0.59 2.21 2.94 3.54 4.41
3.	Kurta-Honavar.	21,405	1st 3rd 5th 7th 10th	16,704 62,690 83,520 1,00,224 1,05,000	0.78 2.93 3.90 4.68

Below Government P. .D. File No.7605/36,
regarding Electrification scheme in Kanara
District.

Electric Grid Offices.

Reference is invited to the Electrical Engineer to Government's remarks at pages 109 and 110 and subsequent endorsement made by the Government.

2. It would appear that the idea underlying the nursery stations is not fully appreciated. It is submitted that they are to be considered mainly from the point of electrical load building with the minimum of expenditure and until such times as the loads in the areas served by the nursery stations are fully developed, the generating capacities of these stations will have to be adjusted from time to time in line with the demand they are required to cope with.. A stage will then be reached when certain stations may either become "selected" or "controlled" power stations, providing sufficient standby generating units to serve the whole area or some or all of the loads in the areas so developed may be transferred to one of the major power schemes, say in this instance, to that of Jog, whichever arrangement is found more economical. If, however, standby units large enough to meet the maximum demand some years hence are installed from the commencement of working, it is doubtful if the scheme will become self-supporting for many years owing to the high fixed charge and comparatively small revenue in the period of load building. One has to consider not only the maximum demand but the

minimum demand as well. The latter demand may persist during the after-midnight hours for some years and for the economic running of the plant, installation of the smaller set in each of the stations is considered essential and provided for. It will also act as a standby to the larger set to a certain extent. In the event of breakdown of the larger set, rearrangement and staggering of load may have to be resorted to for a while to meet the emergency. Installation of a larger set in place of the smaller set, as suggested, cannot be considered as the most economical solution in the circumstances.

3 The Deputy Secretary (P.I.D.) has referred on page 111 to the probable difficulty of transport at present between Karwar and Bhatkal in the monsoon. It is presumed that the transport conditions for the above places, will be improved during the post-war reconstruction period. It must be admitted that full benefit of electric schemes will not be realised without road development. It is not only the question of transport of equipment, but the visit of an expert to any of the places having Nursery Stations may be called upon at short notice in case of emergency. Timely overhaul and expert attention will have to be provided. It will have to be assumed, therefore, that proper facilities for transport of men and material will be available.

4. Both the Electrical Engineer to Government and the Secretary (P.I.D.-I.-) have remarked that they consider the anticipated loads for the proposed schemes exceptionally optimistic

These remarks are apparently based on the figures given in Schedule "B" (page 101). True comparison cannot, however, be made between the actual loads for the existing schemes and the surveyed loads for the proposed ~~existing~~ schemes from the figures given in Schedule "B" for the following reasons :-

- (1) Development of the loads in the case of the existing schemes ~~will~~ was evidently hampered in the last few years of the period selected for comparison owing to "black-out" adopted during hostilities.
- (2) For the working period selected in case of the existing schemes, the figures of population from 1941 Census cannot be taken as correct. The figures from 1931 Census would be more appropriate as figures for the proposed new schemes are taken from 1941 Census.
- (3) Under the heading "Units for lighting" it is evident that the figures for the existing schemes exclude the units consumed for public lamps whereas no such allowance has been made from the figures for the proposed new schemes.
- (4) Those who come in contact with the public and have realised their difficulties in obtaining kerosene for lighting both in towns and villages for the last five years or so, will agree that if and when electricity is made available in those places, its use for lighting

will be much more widespread than
it was in pre-war times.

5. It is emphasised that the licensees controlling the existing supply undertakings, some of which have been selected as the basis for comparison, have looked upon the electrical undertakings as commercial enterprises pure and simple and since these private licensees happened to be first in the field of Town Electrification, they undertook only such schemes which ensured minimum pay load giving them a reasonable return. Partly due to paucity of funds, which could then be procured at high interest charges, and partly due to high industrial tariff rates then maintained in the majority of cases, these schemes suffered from lack of development for years. Whereas, in the case of the proposed Nursery Schemes, most of the available industrial loads so far as is practicable, will be secured under the policy of low Industrial Tariff rates and supply on hire purchase system of electrically operated appliances for industries and electrical pumps when electricity is made available in the places which are at present unelectrified and tools ^{of} ~~and~~ production (both industrial and agricultural) are supplied on easy instalments, considerable fillip will be given to production. It is well known that the increase in production due to change over from manual operation to power drive is appreciable and the advantage thus gained which cannot be gauged in terms of rupees, annas and pies, is a step forward towards the improvement of national economic life.

6. As mentioned in the yearly forecast submitted with the previous note, there will be deficits for some years until the power stations build up their loads and none except the Government can meet these deficits in the cause of national development. If, however, comparison of the anticipated load figures in case of the proposed schemes with the actual load figures obtained from the working of the existing schemes operated by licensees is considered necessary, Schedule "D" has been corrected in the light of the remarks made in sub-para 1 to 3 of para.4 above. It will be seen from Col. 6 of the revised Schedule^{b. enclosed} that the disparity between the figures relating to the existing schemes and those relating to the proposed schemes, is not marked except in the case of Bhatkal. The consumption of units per head of population in case of proposed schemes except Bhatkal varies in the fifth year from 2.94 to 3.90, as against an average figure of about 2.56 for all the existing schemes, mentioned in the Schedule. In the case of Bhatkal, there are about 8 to 10 palatial buildings with well laid out gardens owned by Mahomedan Zamindars and industrialists, and it is anticipated that demand for lighting from these quarters will be considerable

7. As regards Schedule "C" attached to the Electrical Engineer to Government's note the figures given relating to the costs of public ~~a~~ lighting and meter rents in case of the proposed schemes cannot be called unreasonable, if an adequate allowance is

made due to the increased costs of street lighting distribution and meters. It will be ~~realised~~ realised that the above costs have gone up some 400 per cent., when compared with the pre-war normal figures. The number of probable house connections has been estimated after consultation with Municipal authorities and leading public men of various places and may be taken as practicable.

8. It is not definite that the dearness allowance will continue when the operating staff will be engaged for the proposed Nursery Stations and hence the same has not been allowed for. The question of engagement of staff may present difficulties at the moment, but the conditions may improve in the near future.

9. The problem of distributing Jog power in the Kanara towns in question has also been examined. Owing to the limited load potential nature of the country which necessitates long circuitous routes of transmission lines and several river and creek crossings, it is not feasible to serve these towns with Jog power economically.

10. I held up disposal of this file pending consideration of priority in accordance with which electrification of small towns may be undertaken by the Grid Department. I have now submitted this proposal: vide my u.o.r. No. 719.200/5841 dated 11th October 1946. In view of the policy recommended in that note, further consideration of the schemes for Kanara towns mentioned above may be dropped, as there are no cottage industries amenable to electric drive in these places.

11. Since electrification of Kanara District towns is not proposed to be undertaken by this Department within the next five years, pending applications for licenses for the towns of -

1. Karwar,
2. Kumta,
3. Honavar,
4. Bhatkal and
5. Sirsi,

may be considered and the applicants asked to submit information on the points specified in the questionnaire, accompanying my letter ⁺No.Elg.134/5891 dated 16th October 1946 as enclosure No.3. In this connection, reference is invited to para.6 of the same letter.

*under
h.o v. C. W
S.O*

*2731
11/11/46*

Secy. to Govt.,
P.W.D., Bombay.

U.O.P.No.Elg. 775/6245
Bombay:31st Oct.1946.

Encl: 1. *1 Nov*

DDA.

2/12

29

~~Q n8 11~~

760536

44509

11-11-46

P. W. D.

El.Br.(I)

Submitted:

2. These papers deal with the Nursery electrification scheme proposed by the S.O. (Electric Grid) for the following towns and villages in the Kanara Dist. under instructions from the Adviser Revenue.

Generating Station.

1. Karwar.	}	Karwar.
2. Sunkeri village.		
3. Nandangadde village.		
4. Badd village.		
5. Gokarn.		Gokarn.
6. Kumta.	}	Kumta.
7. Honavar.		
8. Sirsi.		Sirsi.
9. Bhatka.		Bhatkal.

The scheme is summarised in the O.N. dated the 2. 11.1945 and was examined in detail by the Electr. Engr. to Govt., the Dy.Secy. and the Secy.(I.) & their comments will be found on pp. ante. The Secy.(I.) had submitted the case to the Adviser Revenue who it seems had handed it over back to the S.O. (El.Grid) for further examination.

3. The S.O. has now returned the case with his remarks on pp. ante. It will be seen from those remarks that the problem of distributing power from the Jog Falls to the towns in question was examined as suggested by the D.S. and it is found that it is not possible to serve the towns in question with the Jog Power economically owing to the limited load potential, nature of the country which necessitates long circuitous routes of transmission lines and several river and creek crossings.

4. The S.O. recommends that if the policy proposed by him separately re: the electrification of small towns which may be undertaken by the Grid Deptt. in the first ~~two~~ ^{five} year period is approved then the scheme in these papers may be dropped

1605/36
1509

as there are no cottage industries amenable to electric drive in the places concerned and licenses may be given to private persons in respect of those places.

5. The file dealing with the policy proposed by the S.O. refd. to in the preceding para. has been submitted separately for orders. ~~The criteria~~ ^{that the criteria} which the S.O. has suggested in those papers, in determining whether any of the small towns should be electrified by Govt. during the first five year period should be

(a) that the total number of houses in the town is about 2000 or more

and

(b) that there are cottage industries like hand-weaving, oil pressing, etc. of reasonable magnitude in which hand operated appliances can be replaced by electrically operated appliances thereby making for appreciable increase in the ~~carrying~~ capacity of the inhabitants.

Learning

The decision on this policy may be awaited before proceeding further with this case.

221
12/11/46

CU
13/11/46

GJP.
12/xi

Agree
M.D.
14/11/46

El. Br (I).

P.W.D.

Resubmitted with reference to the
W:127-128
O.N. & the 12.11.46, which explains the case
12128

2. The Policy mentioned in para 5 of
the O.N. reg. the electrification of small
towns has since been approved by Govt and
orders are being issued to the S.O. (21.
Grid) to undertake detailed investigation
for the electrification of 21 towns conforming
to the policy in question.

3. As there are no cottage industries
available to electric drive in the town
villages mentioned in these papers the S.O.
W:124 125 has recommended that the scheme of
their electrification by Govt may be
dropped and licenses may be
given to private persons in respect
of these ^{places} towns. It is for orders
whether the S.O.'s recommendation
may be accepted.

I think so.

329
14/1/47

88
14.1.47

Yes, the S.O. (Grid) proposal may
be accepted

D S
S. (2)

P.S. P.K.S. 18/1

15/1/47

H.M. P.H.D. 20/1/47

D.C. (9)
1/71

accedly.
21/1/47

5/36
44509

NO 7605/36 EL (I).

P.W.D.
B.C. 25 Jan 1947.

30

The S.O. (El. Grid).

Sub: — Diesel Electric Scheme
for the Kanara Dist.

Reference correspondence ending
with your no Elg. 75/6245, & the
31.10.46.

2. Your proposal to drop the
scheme for electrification by Govt
of the following towns and villages
in the Kanara Dist and to give
licenses in respect of those places,
if they are made
is acceptable.

1. Narwar.
2. Sunkeri.
3. Nandgaude.
4. Badd.
5. Gokarn.
6. Kanta.
7. Honavar.
8. Sisi.
9. Bhatkal.

By order of the S.O.

Copy for information to the S.O. and
to Govt with reference to his no PRM 31/
4540, & the 25.1.46.

21
3/1/47

24/1/47

File
27/1/47

abroad & etc.

+ Vide order
attached.

D.A: — Nil.

ISSUED
On 27/1/47
27/1

Copy of Resolution No.8, regarding the introduction of electricity in Karwar town, passed at the meeting of the citizens of Karwar under the Presidentship of the President, Karwar Municipality, together with the Collector of Kanara's remarks thereon and the endorsement, No.P.W.D.-1269, dated 4th December 1946, from the Commissioner, S.D., respectively.

Resolution No. 8 - This meeting appeal to the Government to undertake introduction of electricity in the Karwar town without which there can be no real scope for industrial development and to examine the Kali River Scheme, as early as possible.

I also strongly support the request of the Karwar Municipality for the introduction of electricity in Karwar Town. Electricity can be brought from the Mysore State, Jog Hydro Electric Station via Bhatkal, Honavar, Kumta and Ankola to Karwar, electrifying the above towns also.

In the meanwhile a license may be granted to suitable private party for installing a thermal station at Karwar.

Submitted.

2. Remarks in the matter have already been called for from the Collector of Salt Revenue, Bombay and the Superintending Engineer, S.C., Belgaum, on receipt of which I will endorse my opinion separately.

tlk
27-12

Letter.

To

The Commissioner, S.D.

No.O/33241-E.

Bombay, 27th December 1946.

Reference your endorsement, No.P.W.D.-1269, dated 4th December 1946, forwarding a petition from the President, Karwar Municipality, together with its accompaniment.

Please submit your remarks on the resolutions regarding the development of Karwar harbour and the introduction of electricity in the Karwar town, to Government in the Revenue and the Public Works Departments, respectively, to whom the respective resolutions have been forwarded for consideration.

By order of the Governor of Bombay,

L.R.D.Coe6ho,

Assistant Secretary to the Government of Bombay
Reconstruction Department.

No.O/33241-E.

Bombay, 27th December 1946.

Copy, forwarded to the Public Works Department, with a copy of Resolution No.8, regarding the introduction of electricity in Karwar town, passed at the meeting of the citizens of Karwar ~~town~~

under....

7605/36
53457

4/134

under the presidency of the President, Karwar Municipality,
together with the Collector of Kanara's remarks thereon and
the endorsement, No.P.W.D.1269, dated 4th December 1946,
from the Commissioner, S.D., for favourable consideration.

By order of the Governor of Bombay,

Field Officer

Assistant Secretary to the Government of Bombay,
Reconstruction Department.

98. Br (S)

P.W.D.

27-12

Submitted

The remarks of the Commr. N.D.
called for remark by the R.C.D.
on the many reasons for introduction
of electricity in the Karwar town
may be awaited.

It may be mentioned
in this connection that the
question of electrification of

E/ 11231/12
Dno/3/11/2

P. W. D.

File No. 7605/36

Serial No. 53457

30-12-46

221
14/1/47

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Page 4 (15247)

Wing. (Pl ex. 515)
17/2 common)

El. Bv. (1)

P. W. D.

Submitted

Annals

2. The Commissioner, S.D. expedited ~~on the 18th February 1947~~⁺
NO. 7605/36-EL.(I) dated the 20-2-47.

18 / 2.47

$$\frac{221}{19(26)}$$

for S.A.S

7
Amind
Ry
Cof

13)
Letter.

The Secretary to Government
Public Works Department.

No. P.W.D.-1262.

Camp Bombay, 3rd March 1947.

Subject :- Introduction of electricity in Karwar town
Resolution No. 3 passed at the public
meeting of the citizens of Karwar held on
2.11.1946.

Reference Government letter Reconstruction Department
No. O/30241-2 dated 27th December 1946.

It is probable that Karwar town which is the
headquarters of the Kanara district would become a valuable
outlet for timber and other forest produce, provided its
naturally protected harbour is developed into a major port
and the scheme of linking it with the M. S. & M. Railway
line materialises and the introduction of electricity would
contribute largely in such development. As suggested by
the Collector of Kanara in para 3 of his remarks passed on
letter No. 634 dated 30th November 1946 from the President,
Karwar Municipality, Karwar town can be supplied with
electric energy from the Mysore State, Jog Hydro Electric
station via Bhatkal, Honavar, Kunta and Ankola. But the
more convenient source appears to be the "Kali-nadi" Hydro
Electric project which would be in the vicinity of Karwar
and which if developed would be the main source of power to
all future industries in the Kanara district. The scheme
may be examined and included in the First Five-year pro-
gramme of the post-war reconstruction scheme if found
feasible.

The needs of Karwar town should, I consider, be given
a high priority in the event of electric energy being
generated at any convenient Hydro Electric station.

E. W. Thomas
Commissioner P.W.D.

1605/36
10355

28

El. Br.

P. W. D.

submitted with reference to the
proceedings on Lb 131-135 anti

2. The Diesel electrification scheme
for Karwar has been dropped ⁺ it
has been decided ⁺ to give ⁺ because
for the supply of electrical energy
at that place to private persons
who may apply for the same

3. As regards the Commr's remarks
overleaf re: the supply of energy to
Karwar either from the Jog Falls
from the Kali. nadi hydro electric
project it is observed that the
problem of the power supply in
the South of the Province as a
whole would be considered
when the report of the Spl
officer prepared by the S.O. (El. Grid)

+ vide Lb 127-
130 anti

El I
6/3

DM 4/3

P. W. D.
File No. 7605/36
Serial No. 10355

to study the industrial potentiality
of the area with reference to the
utilization of Jog Power and the
of Messrs. Associated Consulting
(India) reg. the preliminary issues
of the Kalinadi hydro. electric
are recd.

in the above circumstance

Commr, S.T may perhaps be i
that, the question of power supply
the south of the Tormie as a whole
both from the Jang Falls and by
undertaking the Kalinadi hydro-electric
project is already receiving the
attention of Govt & in the meanwhile
Govt has no objection to the
grant of a license to supply energy
known ~~that a license~~ in granting
the license preference will be given to the
local body failing which co-operative
society formed by local people.

$$\frac{831}{71447}$$

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7. IV 47

D.S.

11.1
8/4(4)

See (9)

Letter

7605/36 EL

P. W. D.

3.C. 10 April 1947

To

The Commr, S.D.

Sub: — AS on p 1317 ante.

Reference your letter ^{to 137} no P.W.D.
1269, d the 3.3.47

The question of power supply to
the South of the Province as a whole
brought from the Jog Falls and by
undertaking the Kalinadi hydro electric
project is already under consideration
of Govt. a. the immediate Govt
has no objection to the grant
of a license to supply energy
to the Karwar town. In granting
the license preference will be given
to the local body, failing which
to cooperative societies formed
by local people.

By order of the Govt.

D. A. - Nil

Copy with a copy of the letter under
reply, to the R. C. D with reference
to its serial no 6/33241 E d the 27.12.46

421.
2/4/47

ISSUED
10/4/47
10/4